ONTARIO ANIMAL

RESEARCH AND SERVICES COMMITTEE

(O.A.R.S.C)

ONTARIO AGRICULTURAL SERVICES

COORDINATING COMMITTEE

DECEMBER 1999

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ONTARIO ANIMAL RESEARCH AND SERVICES COMMITTEE REPORT
1999

Introduction:

The Ontario Animal Research and Services Committee (OARSC) held its annual meeting on November 3 and 4, 1999 at the Ontario Ministry of Agriculture, Food and Rural Affairs' (OMAFRA) head office in Guelph, Ontario. This meeting was well attended with active participation.

All twelve species subcommittees held meetings this year and submitted reports that are appended to this report. The research priorities as identified by each committee play a significant role in the coordination of research in Ontario.

This year is viewed as a transition year for the OARSC in terms of a strategic reporting format as was recommended through the 1998 review of the provincial research coordination process. As such, the subcommittees will each be generating a strategic report in 2000. This report is in advance of the review of the University of Guelph's animal research program and subsequent development of the next four-year program that will take place during 2001. The generation of a strategic report by each of the animal subcommittee's will coincide with the deliberations of the University of Guelph's Animal Research Program. The subcommittee's are responsible for making this an inclusive process and generating a report following the guidelines as presented in the Ontario Agricultural Services Coordinating Committee Manual (October 1999).

Industry Scan:

A great deal of consideration was given to the current and future environment in which the animal industries operate. Ontario's livestock industry is export oriented. Ontario can take advantage of this with an expected increase in global demand for meat and milk products. It is predicted that this global demand will increase production requirements by 60% by 2020 according to a report from the FAO Council for Agricultural Science and Technology (1999). This in itself is a big driver for increased production efficiencies. However, this increase in production has to have the support of the consumer. Consumer demands and perceptions are more critical than ever and are major factors in affecting the sustainability of Ontario agriculture. Publicly funded research needs to be directed towards public good. Ontario must produce commodities through sustainable practices and produce food products that are safe, of high quality and affordable in price.

Common Themes:

Approximately 55 research recommendations covering some 200 research objectives were identified by the 12 animal subcommittees in 1999. In reviewing the subcommittee reports four common areas of emphasis became apparent. These were ranked in order of priority based on their relative rankings from the subcommittees. The areas are:

1) Production Efficiencies (including economics)
2) Food Safety
3) Agriculture Sustainability (including environment and ethics)
4) Product Development and Quality

These are all encompassing areas and include a wide range of specific research recommendations in the areas of: molecular genetics, quantitative genetics, nutrition, health management, informatics, animal behaviour, physiology, reproductive physiology, environmental studies, neutraceutical studies and integrated production systems. Details are available in each of the subcommittees' reports.

Recommendations:

1) The Deer Research and Services Committee requested a name change to be more reflective of its industry. The change was accepted. The committee is now known as the Ontario Deer and Elk Research and Services Committee.
2) The OARSC recommends that alternate/minor species be included as an eligible research category in the 2000 Special Research Fund. (Editor's note: alternate livestock defined as deer/elk, goats [meat and dairy], fur-bearing animals and ratites [emu, ostriches, and rhea] have been included in the 2000 Fund).
3) The OARSC recommends that multi-year funding be made available for research in alternate/minor livestock species.
4) To continue to develop and maintain research expertise within Ontario institutions.
5) In order for research to remain timely and progressive, continued/enhanced base funding of research is a priority.
6) Research must connect all parts of the food production chain i.e. the field to fork continuum.

The time and effort committed by all chairs and committee members in assembling this report are gratefully acknowledged.

Dr. Gwen Zellen, Chair
Ontario Animal Research & Services Committee

Katherine Hoffman,
Research Analyst (Animals)
Ontario Ministry of Agriculture, Food & Rural Affairs

ONTARIO ANIMAL RESEARCH AND SERVICES COMMITTEE

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ONTARIO ANIMAL RESEARCH AND SERVICES COMMITTEE

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DUTIES AND RESPONSIBILITIES OF OASCC MEMBERS

INTRODUCTION

OASCC Committees are, for the most part, focused on a specific commodity sector (e.g. dairy, corn, crucifer crops, meat products and processing etc.). However, there are several committees that operate around a resource or discipline/function focus (economics, soils, engineering, pest management etc.).

Regardless of the committee focus, membership consists of representatives of all the interested stakeholders from the appropriate sector of the industry.

These stakeholders may include:

- producer organizations and marketing boards
- food industry organizations
- agri-business and trade organizations
- Ontario universities involved in research in the subject matter
- researchers from federal and provincial agri-food research stations in Ontario
- researchers from private institutions and agri-business
- extension specialists and other staff from the Ontario Ministry of Agriculture, Food and Rural Affairs
- consumer and special interest groups

RESPONSIBILITIES OF THE ORGANIZATION

The sponsoring organization should select a capable representative who is prepared to put the necessary time and effort into doing a thorough job. The organization is also responsible for covering any expenses incurred by the representative. In most cases, meeting room costs, etc. are covered by OMAFRA, AAFC or the University of Guelph.

The representative is expected to convey the views, needs, concerns and priorities of the organization. To do so in a meaningful way, the organization should provide a mechanism for the representative to gather that information from its membership. This may be done, for instance, by creating a research committee within the organization to develop its position. Organizations which fund research themselves often use the same committee that reviews research proposals for funding support. Regardless of the mechanism, the organization needs to ensure that it is its views, and not those of the individual, that are conveyed to the OASCC Committee.

The representative should also report back regularly to the membership of the organization. The organization can provide such opportunity on the program of annual meetings. Or, the organization may be interested in holding research information days at which the representative can play a lead role.

DUTIES AND RESPONSIBILITIES OF THE MEMBER

The member conveys the views of his/her organization to the Committee. That means doing one's homework prior to the meeting and participating fully in the discussions at the meeting. It also means follow up after the meeting to review and comment on the draft Committee report and to communicate the results of the meeting to his/her constituent organization. It does not matter whether the member represents a producer organization, a University department, a research station or a special interest group, the same rules apply.

The member should gather together a report (preferably in writing) from his/her organization which outlines the issues and concerns facing that sector of the industry, the priorities of the organization and recommendations on how to address those needs. The collection of this information should be an ongoing activity throughout the year with endorsement of the final presentation from the organization.

The member should articulate and defend the organization's position on issues and priorities. The process within the Committee should be one of consensus building but the views of the majority should prevail. The member may insist on a "minority decision" going forward if the organization holds strong views on a subject.

The member should take every opportunity to report back to his/her organization on the activities and recommendations of the Committee. Regular two way communication is the key to successful operation of the OASCC system.

HOW TO APPOINT A REPRESENTATIVE

Any organization may request that it be allowed a representative on any appropriate OASCC Committee(s) in which it has a direct or indirect interest. The organization should contact the Chair of the Committee directly or, where this is not known, contact:

Chair
Ontario Agricultural Services Coordinating Committee
Ontario Ministry of Agriculture, Food and Rural Affairs
1 Stone Road West, 4NW
Guelph, Ontario N1G 4Y2
(phone: 519/826-4184; fax 519/826-4211)

The appointment should be made for a four year period. Changing representation more frequently results in a lack of continuity between the organization and the Committee.

RESPONSIBILITIES OF OASCC

- Ensure all interested stakeholders are represented.
- Ensure the voice of each stakeholder is heard and acknowledged.
- Come to a consensus on priorities.
- Report on feedback from other (higher) committees and responsible agencies.

RESEARCH PRIORITY RANKING

The number code represents the priority of research where:

1. Very Important
2. Important
3. Desirable but less important than the above rankings.

The letter code indicates the apparent level of research effort to be invested where:

A. New topic, no known research underway;
B. Expansion of effort needed but some work currently underway;
C. Continue of effort at current level;
D. Decrease or discontinue effort.

* Commencing with the year 2000's report, the alpha numeric ranking system will no longer be used. Instead priorities must be ranked in order of priority (i.e. 1,2,3 etc.). If they are not ranked by the committee the priority order will be the order in which they are listed.

GENERAL STATISTICS FOR THE ONTARIO LIVESTOCK INDUSTRY

The tables that follow show:

1. Average prices to the Ontario producer.
2. Farm cash receipts from farming operations in Ontario, 1993-1998.
3. Income of Farm Operators from Farming Operations, 1993-1998.
4. Imports and exports of Ontario and Canadian Agri-Food products.
5. Canadian per capita consumption of selected food products, 1991-1998.
6. Canadian per capita consumption of selected animal products, 1991-1998.
7. Slaughter trends at commercial establishments in Canada on a provincial basis.
8. Rank and size of the Ontario livestock and poultry industry.

Detailed information on the state of the industry for each specie/commodity is included in each sub-committee report.

AVERAGE PRICE TO THE ONTARIO PRODUCER, 1992-1998

	1992	1994	1995	1996	1997	1998
Slaughter steers, $/cwt	85.65	94.24	80.64	75.88	80.93	81.08
Slaughter lambs, $/cwt	97.99	116.60	130.62	138.22	142.88	133.62
Hogs, index 100, $/100 kg	132.00	145.00	151.00	189.00	187.00	126.8
Chickens, $/kg	1.51	1.45	1.41	1.56	1.53	1.58
Turkeys, $/kg	1.60	1.66	1.67	1.85	1.81	1.78
Eggs, $/doz	0.86	0.94	0.99	1.11	1.04	1.00
Milk, $/hl	-	52.05	51.82	51.80	51.47	52.24

Source: Statistics Canada

Farm Cash Receipts from Farming Operations, 1993-1998

	1993	1994	1995	1996	1997	1998
			-$'000-			
Wheat	81,264	136,986	163,754	159,802	73,734	114,150
Oats	6,710	5,557	6,501	5,371	5,201	4,847
Barley	11,511	10,805	11,998	14,463	11,612	10,148
Rye	1,856	4,132	4,095	5,845	5,410	5,025
Canola	8,825	14,689	21,070	12,314	17,507	17,870
Soybeans	418,426	470,895	590,909	558,461	726,560	688,568
Corn	266,355	333,102	474,347	509,232	434,765	384,652
Potatoes	49,588	58,858	53,794	48,956	57,625	54,774
Vegetables	392,341	415,626	432,407	443,796	464,211	481,858
Apples	51,275	55,120	73,878	80,352	90,951	76,714
Other tree fruits	36,227	48,322	49,953	36,355	42,822	44,981
Strawberries	17,012	27,461	28,381	14,073	17,351	17,431
Other berries, grapes	24,956	32,536	37,775	39,458	46,114	51,569
Floriculture and nursery	393,310	418,499	445,287	469,508	505,264	577,397
Tobacco	250,836	344,925	270,402	323,630	331,873	333,124
Ginseng	50,200	47,840	47,300	51,612	39,897	36,851
Dry beans	28,363	48,949	63,723	36,057	28,640	44,635
Forage and grass seed	2,036	1,872	1,601	1,620	1,824	1,739
Hay and clover	10,375	14,735	21,520	25,407	27,879	29,080
Maple products	8,658	9,261	9,897	14,807	10,108	8,125
Forest products	16,484	18,101	19,718	20,787	20,977	19,849
Christmas trees	..	..	..	..	11,700	11,700
Miscellaneous crops	17,012	17,628	16,971	14,360	14,859	15,073
Total crops	2,143,620	2,535,899	2,845,281	2,886,266	2,986,884	3,030,160
Cattle	862,678	822,827	760,398	781,670	781,861	854,622
Calves	111,033	114,122	86,300	71,115	87,462	84,970
Hogs	561,034	535,301	587,417	744,165	782,718	589,665
Sheep	1,900	1,705	1,983	1,870	2,190	2,636
Lambs	21,220	19,773	21,485	24,079	22,539	22,169
Dairy products	1,072,547	1,155,183	1,169,532	1,185,680	1,234,543	1,270,365
Hens and chickens	343,050	358,065	341,455	406,481	418,081	433,841
Turkeys	88,982	96,746	101,082	124,383	118,163	110,443
Hatcheries	..	..	..	..	12,459	14,984
Eggs	192,922	199,939	211,158	211,158	191,806	184,248
Honey	240	279	628	374	363	264
Furs	8,762	8,752	8,182	9,417	8,758	9,535
Wool	7,530	11,474	10,264	18,983	13,597	13,068
Miscellaneous livestock	72,386	73,590	72,991	72,435	73,861	72,168
Total livestock and products[a]	**3,362,625**	**3,418,527**	**3,390,719**	**3,694,162**	**3,766,854**	**3,680,587**
NISA	23,902	9,217	11,593	30,295	34,318	76,027
GRIP (revenue protection)	108,735	17,766	-199	563	-	-
Crop insurance	182,206	38,015	25,818	58,096	47,154	51,329
Price stabilization	5	5	2	-	-	-
Tripartite payments	5,213	7,728	725	14	-29	-3
Provincial stabilization	1,167	409	-	-	-	-
Dairy subsidy	70,029	69,107	65,258	53,742	53,284	47,364
Other payments	27,976	1,162	8,210	1,122	1,860	16,706
Total payments	**419,233**	**143,409**	**111,407**	**143,832**	**136,587**	**191,423**
Total receipts	**5,925,478**	**6,097,835**	**6,347,407**	**6,724,260**	**6,890,325**	**6,902,170**

a Includes receipts from the sale of horses and embryos, which are not explicitly listed in the table.
Source: Statistics Canada, Catalogue No. 21-603
Last update: November 1999

Income of Farm Operators from Farming Operations, 1993-1998

	1993	1994	1995	1996	1997	1998
	-$'000-					
+ Total farm cash receipts	5,925,478	6,097,835	6,347,407	6,724,260	6,890,325	6,902,170
- Operating expenses after rebates	4,793,671	5,050,713	5,186,576	5,447,192	5,598,168	5,656,709
= Net cash income	1,131,807	1,047,122	1,160,831	1,277,068	1,292,157	1,245,461
+ Income-in-kind	43,767	48,054	45,997	47,784	48,667	46,690
- Depreciation	727,494	750,179	783,309	823,887	851,948	875,089
= Realized net income	448,080	344,997	423,519	500,965	488,876	417,062
+ Value of inventory change	128,284	131,107	14,934	136,242	123	55,251
= Total net income	576,364	476,104	438,453	637,207	488,999	472,313

Source: Statistics Canada, Catalogue No. 21-603
Last update: November 1999
Next update: May 2000

Agri-food Trade by Commodity Group, Ontario and Canada, 1997 - 1998 (Cdn $' 000)

	Exports 1997	Exports 1998	Imports 1997	Imports 1998
Ontario:				
Live animals	412,588	426,778	49,417	60,357
Red meats	474,425	430,918	585,047	605,798
Fish and products	106,922	126,752	459,503	519,675
Poultry and eggs	111,008	115,091	270,886	348,860
Dairy products	87,942	123,848	160,578	184,360
Other animal products	334,562	307,401	250,836	225,524
Grains	72,978	70,158	200,082	177,827
Grain products	708,735	814,867	618,291	722,813
Oilseeds	204,303	148,898	229,010	152,633
Oilseed products	288,525	245,325	346,481	321,770
Animal feeds	353,494	362,138	370,715	428,813
Fruit and nuts	71,666	73,139	1,362,689	1,449,210
Vegetables	361,682	458,478	942,008	1,046,515
Seeds for sowing	36,874	35,876	101,795	132,329
Vegetable fibres	1,087	1,307	90,726	118,720
Floriculture and nursery products	198,938	228,674	136,349	163,133
Tropical products (excl. fruit)	258,225	389,235	778,930	961,522
Sugar and confectionery	384,324	439,325	574,193	614,931
Other edible preparations	296,662	363,244	619,259	697,801
Beverages	771,302	860,922	552,878	683,371
Tobacco and products	154,791	154,091	82,407	82,144
Other agri-food products	46,268	44,684	59,503	69,391
Total	**5,737,303**	**6,221,150**	**8,841,583**	**9,767,496**
Canada:				
Live animals	1,882,868	1,953,771	123,623	164,042
Red meats	2,488,214	2,498,955	989,109	1,000,227
Fish and products	3,036,818	3,218,027	1,587,362	1,798,442
Poultry and eggs	183,218	196,288	384,123	472,709
Dairy products	369,325	398,318	282,380	316,468
Other animal products	695,308	663,512	407,986	372,073
Grains	6,390,010	4,669,006	370,467	389,894
Grain products	1,181,779	1,355,930	990,843	1,151,545
Oilseeds	1,957,461	2,478,778	299,220	240,623
Oilseed products	1,153,149	1,274,437	683,373	626,547
Animal feeds	882,182	806,666	577,318	634,440
Fruit and nuts	291,880	344,101	2,593,746	2,739,209
Vegetables	1,500,232	1,831,178	1,728,796	1,924,404
Seeds for sowing	211,218	239,327	143,503	190,888
Vegetable fibres	31,486	35,608	161,185	227,614
Floriculture and nursery products	500,297	610,351	254,456	295,703
Tropical products (excl. fruit)	417,177	567,660	1,550,909	1,742,054
Sugar and confectionery	606,454	705,946	1,032,406	1,099,436
Other edible preparations	465,033	634,017	905,844	1,026,999
Beverages	1,220,883	1,338,841	1,239,864	1,484,600
Tobacco and products	222,642	215,348	118,316	119,649
Other agri-food products	66,229	77,370	122,859	139,216
Total	**25,753,863**	**26,113,438**	**16,547,690**	**18,156,782**

Source: Statistics Canada, International Trade Division.

Per Capita Consumption of Selected Foods, Canada, 1991-1998

Red Meats, Poultry Meat and Eggs									
Type	**Units**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
Beef									
- Carcass weight basis	kg	33.3	32.4	31.1	31.7	31.7	31.4	30.9	30.7
- Retail weight basis	kg	24.3	23.6	22.7	23.1	23.2	22.9	22.6	22.4
Veal [a]	kg	1.5	1.5	1.4	1.3	1.4	1.3	1.4	1.3
Mutton and lamb [a]	kg	0.9	0.8	0.9	0.8	0.8	0.8	0.7	0.8
Pork									
- Carcass weight basis	kg	25.9	28.4	27.6	28.4	27.8	25.9	25.3	27.0
- Retail weight basis	kg	19.7	21.6	21.0	21.6	21.1	19.7	19.3	20.5
Offal	kg	1.7	1.5	1.1	1.5	1.4	1.3	1.2	1.4
Total red meats [a]	**kg**	**63.2**	**64.5**	**62.0**	**63.7**	**63.0**	**60.7**	**59.5**	**61.3**
Stewing hen and chicken	kg	23.8	24.3	24.9	26.4	26.2	26.6	27.4	28.2
Turkey	kg	4.5	4.6	4.4	4.4	4.3	4.1	4.2	4.3
Total poultry meats [b]	**kg**	**28.3**	**28.8**	**29.3**	**30.8**	**30.5**	**30.7**	**31.7**	**32.4**
Eggs	dozens	15.0	14.6	14.5	14.5	14.4	15.0	15.1	15.2

a Carcass weight basis.
b Eviscerated weight. Excludes goose and duck meat.
Sources: Statistics Canada, Catalogue No. 32-229.

Dairy Products and Margarine									
Type	**Units**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
Cottage cheese	kg	1.03	0.92	0.88	0.86	0.83	0.76	0.72	0.71
Creamery butter	kg	2.99	2.80	2.88	2.88	2.76	2.85	2.60	2.87
Skim milk powder	kg	1.09	1.06	1.14	1.08	0.92	1.28	1.03	1.25
Whey powder	kg	0.87	0.79	1.01	0.97	0.94	1.10	0.80	0.32
Evaporated milk	kg	1.50	1.55	1.52	1.49	1.61	1.14	1.26	0.71
Cheddar cheese as such [a]	kg	3.12	3.08	3.02	3.18	3.24	3.06	3.17	3.15
Process cheese	kg	2.77	2.79	2.71	2.77	2.73	2.58	2.43	2.24
Other cheese as such [ab]	kg	5.31	5.39	5.45	5.59	5.62	5.65	6.50	6.31
Total Cheese	**kg**	**11.20**	**11.26**	**11.18**	**11.54**	**11.59**	**11.29**	**12.10**	**11.70**
Yogurt	kg	3.19	3.11	3.25	3.30	3.25	3.38	3.40	3.67
Sour cream	L	0.99	0.95	1.03	1.02	0.94	0.92	0.93	1.08
Ice cream	L	10.95	10.41	11.02	11.89	11.61	11.15	10.56	10.37
Margarine [c]	kg	5.55	5.33	5.43	4.90	5.17	4.97	4.11	4.06

a Not including cheddar and other cheese used in process cheese.
b Per capita consumption of whey and skim milk cheese is included in this category.
c Estimate based on change in manufacturers' sales.
Source: Statistics Canada, Catalogue No. 32-229

Number of Livestock Slaughtered in Commercial Establishments[a]
Canada and the Provinces, 1997 and 1998

Province	Cattle & Calves		Hogs		Sheep and lambs	
	1997	1998	1997	1998	1997	1998
			- '000 head -			
Nfld	3.0	2.8	6.1	7.3	4.0	3.4
PEI	37.8	34.8	195.8	185.0	1.0	1.0
NS	31.4	33.2	233.2	224.4	11.1	11.9
NB	29.8	27.6	173.6	144.2	1.8	1.9
Quebec	506.4	493.5	6,252.4	5,751.7	84.2	86.2
Ontario	800.5	773.8	4,011.7	3,485.7	240.0	229.9
Manitoba	47.9	36.0	2,346.3	1,878.0	11.4	10.8
Saskatchewan	285.7	355.5	1,332.1	1,181.3	14.2	12.4
Alberta	1,827.1	1,958.9	2,156.5	2,264.4	71.4	66.0
British Columbia	60.9	54.3	291.2	262.6	44.8	40.8
Canada	**3,630.5**	**3,770.4**	**16,998.9**	**15,384.6**	**483.9**	**464.3**

a Includes federally and provincially inspected slaughterings as well as farm kill.
Source: Statistics Canada, Catalogue No.23-603

The Size of the Ontario Livestock and Poultry Industry

Industry	July 1,1998	July 1,1999	% change 99/98	Numbers in Can'99	Rank in Canada
	'000 head		%'000 head		#
Bulls(>1 yr.)	27.0	26.0	-3.7	257.7	3
Dairy cows	402.0	400.0	-0.5	1,197.6	2
Dairy heifers(>1 yr.)	196.0	192.0	-2.0	523.4	2
Beef cows	425.0	400.0	-5.9	4,555.9	4
Beef Heifers for breeding(>1 yr.)	73.0	68.0	-6.8	749.5	4
Beef heifers for slaughter(>1 yr.)	144.0	149.0	3.5	958.3	2
Steers(>1 yr.)	280.0	285.0	1.8	1,486.5	2
Calves(<1 yr.)	625.0	590.0	-5.6	4,776.4	3
Total Cattle & Calves	2,172.0	2,110.0	-2.9	14,505.3	3
Sows & Bred Gilts	340.1	334.1	-1.8	1,272.2	2
Boars, 6 months & over	15.7	14.0	-10.8	52.6	1
Other Pigs under 20kg	1,068.7	1,058.6	-0.9	3,754.9	2
Other Pigs, 20-60 kg	1,038.2	1,008.0	-2.9	3,701.9	2
Other Pigs, over 60 kg	868.3	966.6	11.3	3,606.4	2
Total Pigs	3,331.0	3,381.3	1.5	12,388.0	2
Sheep(> 1yr.)	131.0	141.3	7.9	472.2	1
Lambs	101.0	114.0	12.9	413.2	1
Total Sheep & Lambs	232.0	255.3	10.0	885.4	1
Layers	8,338.0	8,512.0	2.1	22,475.0	1
Broilers	19,856.6	20,768.0	4.6	67,756.4	1
Turkeys	2,814.1	2,819.8	0.2	7,512.7	1

Source: Statistics Canada

ONTARIO AQUACULTURE RESEARCH AND SERVICES COMMITTEE

EXECUTIVE SUMMARY

The Ontario Aquaculture Research and Services Co-ordinating Committee (OARSCC) has established a list of nineteen research and service priorities which it recommends to the Ontario Agricultural Services Co-ordinating Committee (OASCC) for 1999.

Fish production for 1999 is estimated to be 4000 metric tonnes with significant production coming from the cage culture sector. This is the same level of production as for the previous year with industry diversification indicated by the variety of species represented. Fish farmers in Ontario recognize the efforts of the Ministry of Agriculture, Food and Rural Affairs to provide continued funds for the services and research so essential to this developing industry and those of the University of Guelph for delivering them. The industry continues to await the promised provincial Aquaculture sector strategy that will ensure consistent treatment from various Ontario ministries. Competition with other users of resources is identified as an emerging issue. Several research proposals address concerns for the assessment, reduction and amelioration of environmental impacts. Public acceptance of the industry will depend on an effective education program.

COMMITTEE ACTIVITIES

The Ontario Aquaculture Committee (OARSCC) serves as an expert committee and clearing house, providing combined industry-university-government reviews and opinions on proposed policies, regulations, research proposals and projects concerning aquaculture, in addition to its role as a commodity sub-committee in the OASCC structure. The OARSCC will continue to provide a forum for working level discussion of problems affecting the industry. The Aquaculture Implementation Committee (AIC) will implement the Federal Aquaculture Development Strategy of 1995, and serve as a senior-level forum for resolving problems of a policy and legislative nature, both provincial and federal.

For the fifth consecutive year, the committee has been invited to join the team that reviews and recommends proposed aquaculture-related research and services for funding by OMAFRA under Program 42 at the University of Guelph.

STATE OF THE INDUSTRY

The total estimated industry output for 1999 is approximately 4000 metric tonnes of food grade fish. This represents the same total production as the previous year. While there has been a slight decline in trout production, other sectors have increased with the effect of maintaining previous production totals. The industry has enjoyed stabilization in the whole sale price of trout. Other species that are being cultured include Arctic charr, tilapia, smallmouth and largemouth bass, and cyprinid baitfish.
The excellent efforts of OMAFRA and the University of Guelph to support and promote fish farming as an emerging business are once again recognized by the aquaculture industry. The

University has maintained its role of research and extension development and veterinary support while OMAFRA has assumed an aggressive position of leadership and a greater role of advocacy for the industry.
The roles that various provincial ministries play with the fish farming industry, and which are alternately involved in advocacy, development, regulation and enforcement, are often perceived as being in conflict. In an effort to resolve these problems an initiative to develop a unified provincial sector strategy on aquaculture was undertaken over a year ago. Although the strategy has been promised for almost a year, it has not been released for review or implementation. The industry strongly encourages the province to complete the task that it has begun.

The need for increased opportunity to encourage small operators to enter the industry continues. The costs of obtaining various licenses when added to the costs of start-up are a disincentive to the development of new facilities. For example, new farms must obtain a 'certificate of approval' for the construction of 'sewage treatment works'. There is a flat rate fee set at $6,000 for this permit, regardless of the size or complexity of the proposal. This is a real barrier to the development of new farms. Fish farming in Ontario is an industry with considerable potential for diversification and growth but it continues to be frustrated by an unsympathetic regulatory framework that does not encourage continued investment or development.

The occurrence of diseases new to the Ontario industry is of ongoing concern as a result of the increase in the number of alternative species being cultured. The culture of these new species is taking place as a result of the expanded 'List of Species Allowed' which was adopted in the interim policy amendments of 1995. The capability to detect, treat and manage these diseases must be developed to ensure the growth of these new sectors of the industry.

There continues to be no regulation of food safety for fish products that are both processed and sold within Ontario. A single incident of illness resulting from the consumption of un-inspected fish will do irreparable harm to the industry by eroding consumer confidence in farmed products. The Ontario government should take steps to either implement the existing Ontario Fish Inspection Act, or develop reasonable policies for the inspection and maintenance of food safety of domestically sold fish. The efforts of the Canadian Food Inspection Agency to harmonize existing international, federal, provincial, and municipal food production and handling regulations should be expedited. Government must also encourage our international trading partners to develop harmonized food safety regulations.

EMERGING ISSUES

The perceived impact of fish farming on the environment is increasing in importance. The aquaculture industry continues to compete with recreational and non-consumptive users for the aquatic resources. As these competitive groups become more vocal, there has been an increase in the number of negative accounts of the industry in the popular press. It has become evident in the past year that the fish farming industry is being faced with decreased availability of water caused by decreasing volume and competition with other users. Policies need to be developed to resolve the demands of multiple users for a single resource.

With respect to cage culture facilities, there is no acceptable standard for levels of discharge against which to measure industry compliance. Government agencies need to work together to develop a consolidated perspective for dealing with these concerns. It should contain consistent standards for acceptable treatment of waste and incorporate these into a policy that is evenly applied to all farming activities. Methods to reduce the impact of intensive husbandry and to accurately estimate the assimilative capacity and ability of various receiving waters to sustain farm development must be investigated. Public education programs are needed to identify the real issues, problems and methods of dealing with environmental impacts and multiple-user interests in a realistic and effective way.

RESPONSE TO 1998 RECOMMENDATIONS

The aquaculture industry has received continued support by OMAFRA and the University of Guelph in both non-research and research activities. Extension and Veterinary Service is an ongoing effort of the University of Guelph and the OMAFRA Aquaculture Program and the Coordinator, Professor R. Moccia. While Dr. Ferguson is on leave, Dr. Phil Burne has been hired as pathologist to continue the diagnostic work of Dr. Ferguson. The restructuring of the veterinarian services came about as a result of industry recommendations. These services are essential for the continued growth and advancement of the industry and the University of Guelph continues to be the primary provider of these services in the province. In addition, OMAFRA has continued to staff the position of Aquaculture Specialist, so the on-farm needs of fish farmers in Ontario can be addressed more effectively by that ministry.

There are eleven aquaculture related research projects being conducted at the University of Guelph in 1999 -2000. Projects include studying the identification of trait loci for growth and age of sexual maturation of rainbow trout; the use of molecular markers to evaluate the role of stress in embryonic development; welfare status of cultured salmonid fishes using physiological biotelemetry, and quality improvement and shelf-life extension of fish fillets and deboned fish meat from three aquacultured species have continued to be funded from last year. As well seven new projects have been undertaken. These projects investigate the use of PCR for the detection of fish pathogens in carrier fish and the environment; development of economically and environmentally sustainable feeding strategies; the development of strategies for gene improvement in salmonids; the use of molecular pedigree for the analysis of selective breeding for rainbow trout, the role of quality of ingredients of fish feed; the replacement of synthetic carotenoid pigments with lycopene extracts for trout and salmon pigmentation and the performance characteristics of the Ontario Aquaculture Industry. Of the 19 recommendations made in 1998 14 have been addressed with projects by the University of Guelph in the last year.

PRIORITY RANKING SYSTEM

To rank individual recommendations, the committee used the following alphanumeric system to assign a relative level of priority.

The first number code identifies the priority of the research, where:

1. Very Important
2. Important
3. Desirable but Less Important Than Above Rankings

The second letter code identifies the level of research effort to be invested in that particular objective, where:

A. New Topic, No Known Research Underway
B. Expansion of Effort Needed, but Some Work Currently Underway
C. Continue Effort at Current Level
D. Decrease or Discontinue Effort

1999 RESEARCH & SERVICES RECOMMENDATIONS

The Ontario Aquaculture Committee recommends that research and service activities be undertaken according to the specific objectives presented below. Both the recommendations by subject area and the individual objectives within each area are presented in the order of their priority to the aquaculture industry.

In the past, the industry has indicated agencies where individual recommendations should be directed for response. The comments received have been helpful. However, it is important to view the subject areas as integrated components of aquaculture as a whole. Therefore, the Committee recommends that the entire report for 1999 be sent to the agencies listed below. They should be asked to provide both comments and a description of research projects that they are either funding or directly undertaking to address the specific issues listed.

Canadian Agriculture Research Council (CARC)
Department of Fisheries and Oceans (DFO)
Environment Canada (EC)
Ontario Ministry of Agriculture Food and Rural Affairs (OMAFRA)
Ontario Ministry of Environment (OME)
Ontario Ministry of Mines and Northern Development (OMAND)
Ontario Ministry of Natural Resources (OMNR)
Natural Sciences and Engineering Research Council (NSERC)

RECOMMENDATION #1 — PRIORITY 1
EXTENSION AND VETERINARY SERVICES (NON-R&D)

BACKGROUND

Since aquaculture is an emerging industry, there is a vital need for on-farm extension services to assist fish farmers to overcome problems and for transfer of technology and results derived from ongoing applied research, thereby improving productivity and competitiveness. Enhanced extension and on-farm diagnostic programs are required to improve assistance and disease control, and to establish training programs. On-farm visits improve communication, facilitate technology transfer and information dissemination, and allow first hand experience of on-farm conditions such as growing densities. The committee considers the maintenance of the non-diagnostic extension program of the Aquaculture Extension Centre as well as the diagnostic extension programs at the Ontario Veterinary College at the University of Guelph essential.

DETAILED OBJECTIVES

1-C 1.Ma intain the level of extension services which include more on-farm consultations and communication, technology transfer workshops, information seminars, fact sheets and possibly short certificate courses offered to farmers to upgrade their skills.

1-C 2.Ma intain the level of diagnostic clinical and on farm services being provided to the commercial fish farming industry in Ontario.

RECOMMENDATION #2 **PRIORITY 1**

HEALTH MANAGEMENT AND DISEASE RESEARCH

BACKGROUND

The lack of registered therapeutants for aquaculture is a concern from both an environmental and a food safety point of view. The most common diseases of rainbow trout in Ontario farms are gill, and skin diseases which are estimated to cause an average of 30% annual losses expressed by numbers. New disease problems are being encountered as a result of the increase in alternative species cultured

Research should be conducted to determine the aetiology and pathogenesis of economically significant diseases in an attempt to offer more effective measures of control and detection. The long term objective is to determine the mechanisms of action of the diseases with a view to improving productivity.

DETAILED OBJECTIVES

1-B 1.D etermine the efficacy of chemo-therapeutants commonly utilized in aquaculture, the biological dynamics of these compounds related to environmental impact and their persistence and clearing rates from fish when used as a treatment prior to harvest

1-B 2.De termine the pathobiology, and effective management of diseases which are of economic signifigance to the fish farming industry of the province of Ontario, including newly emerging diseases in species which may become commercially important to the fish farming industry, as well as the common gill and skin diseases of salmonids

1-B 3. Develop new detection and epidemiological techniques, and apply them to on farm examination.

2-B 4. Investigate alternatives to chemo-therapeutant treatment, such as vaccines and alternative husbandry practices, and determine which represent more effective means of disease prevention

RECOMMENDATION #3 **PRIORITY 1**

ENVIRONMENTAL IMPACT RESEARCH

BACKGROUND

Aquaculture facilities tend to be custom designed to suit each available site, and little attention has been devoted to determining the relative efficiencies of different technologies and rearing systems. Current guidelines for aquaculture effluents do not encourage water conservation, nor do they address mass loading of nutrients discharged from aquaculture facilities. Thus, there is a need to develop production systems, feeding management practices, and other technologies that maximize the efficiency of culturing rainbow trout and other species while at the same time minimizing the environmental effects of this fish production.

DETAILED OBJECTIVES

1-C 1.I nvestigate the development and application of process technology that encourages water conservation, reduces environmental effects and increases efficiency and profitability.

1-B 2.I nvestigate various approaches to quantify and mitigate environmental inpacts of fish farming activities specifically to develop techniques to estimate the impacts on assimilative capacity of various receiving water systems.

RECOMMENDATION #4 **PRIORITY 2**

GENETICS, BREEDING AND REPRODUCTIVE CONTROL RESEARCH

BACKGROUND

Researchers should evaluate established Ontario rainbow trout strains under Ontario conditions with respect to spawning time, growth rate and disease resistance etc., and establish a breeding program to optimize these characteristics. Very little is known about the genetic make-up and potential for improvement of performance of the rainbow trout stocks cultured in Ontario, and we are therefore not fully exploiting the genetic potential of our domestic stocks of fish. The controlled manipulation of reproductive cycles, especially for Arctic charr, should be developed.

DETAILED OBJECTIVES

2-C 1.D etermine genetic variability, specific parameters, and gene-environment interactions which affect growth performance and disease resistance in rainbow trout, with the aim of improving those stocks.

2-C 2. Integrate molecular genetic technologies into freshwater aquaculture, and include gene mapping of desirable production traits and monitoring of existing rainbow trout, Arctic charr and other salmonid stocks.

2-C 3. Enhance reproductive cycle control through improved understanding of early developmental biology, and development of improved gamete quality and preservation methods. In particular look to address the serious problem with reproductive performance in the Arctic charr.

RECOMMENDATION #5 **PRIORITY 2**

NUTRITION AND BIOENERGETICS RESEARCH

BACKGROUND

Feed costs in aquaculture are high, constituting up to 60% of the unit cost of production of raising carnivorous fishes such as trout, charr, and salmon. The aim of this research is to maintain or reduce the present cost of feeding salmonids through diet reformulation and improved feed processing techniques, and to improve efficiency and reduce waste discharge by optimizing diets and feeding strategies.

DETAILED OBJECTIVES

2-B 1.I nvestigate alternative protein sources for salmonid feeds to reduce dependency on expensive fish and soybean meals.

3-C 2. Develop production diets and feeding regimes suitable for those alternative species which have demonstrated potential for economic development in Ontario.

2-C 3.D evelop appropriate feeds and feeding strategies to improve feeding efficiency and reduce waste outputs.

RECOMMENDATION #6 **PRIORITY 2**

FOOD PRODUCTS AND PROCESSING TECHNOLOGY RESEARCH

BACKGROUND

In order to improve our competitive position against other red and white meat commodities, and to better challenge imports from other countries like the United States, there is a need to develop innovative, value-added products using rainbow trout and other domestically farmed fish species.

DETAILED OBJECTIVES

2-B 1. Develop and refine advanced processing and packaging techniques to add value and assure food safety and quality, thus increasing the marketability of trout products.

2-B 2. Evaluate and develop new aquaculture products, with the aim of enhancing the value and marketability of Ontario's farmed fish. Utilize consumer testing and sensory evaluation studies to improve our understanding of consumer preferences.

RECOMMENDATION #7 **PRIORITY 2**

IMPROVE WELFARE OF FARMED FISH

BACKGROUND

Objective methods of measuring animal response are needed for evaluation of the effect that current and alternative husbandry practices have on behaviour and stress in aquatic animals. This information will allow fish farmers to develop and adopt optimum culture practices and respond effectively to ethical concerns regarding the holding and husbandry of fish.

DETAILED OBJECTIVES

2-B 1. Develop objective methods for assessing the general welfare of farmed fish through quantitative evaluation of their physiological responses to various husbandry and management practices

2-B 2.E stablish husbandry protocols that maximize the health and welfare of farmed fishes, without sacrificing production performance or sustainability for the farming operation.

RECOMMENDATION #8 **PRIORITY 3**

ECONOMIC ANALYSES, INDUSTRY PROFILE AND MARKETING RESEARCH

BACKGROUND

Certain market information and other 'Measures of Performance' are required to establish a competitive advantage for the Ontario aquaculture industry. This includes research focused on identifying key factors essential for industry success, and enhancing the impact of specific management skills and training programs designed to improve the profitability of aquaculture operations.

DETAILED OBJECTIVES

3-C 1.I dentify those management factors which most contribute to farm success and evaluate the best methods for enhancing them.

2-C 2. Continue the collection of the 'Aquastats' database for production management and forecasting of Ontario aquaculture.

1999 ONTARIO AQUACULTURE COMMITTEE

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Legend:

DFO	Fisheries and Oceans Canada
OAA	Ontario Aquaculture Association
OMAFRA	Ont. Ministry of Agriculture, Food and Rural Affairs
OME	Ontario Ministry of Environment
OMNR	Ontario Ministry of Natural Resources
UG	University of Guelph

ONTARIO BEEF RESEARCH AND SERVICES COMMITTEE

EXECUTIVE SUMMARY

The Committee met on June 29. Production efficiency and consumer issues (meat quality and safety, confidence in the food supply) were identified as the top research priorities and technology transfer was identified as the priority item for service. These three areas are similar to previous recommendations however, consumer issues was clearly identified this year as a larger issue than just meat quality and food safety, which was highlighted in previous years.

The Ontario and Canadian cattle industries are still facing challenges with increased price competition in the market place from pork and poultry products. In addition the United States appears to be adopting a more "protectionist" attitude towards cattle and beef imports from Canada and elsewhere as shown with the announcement of the anti-dumping duty on live cattle shipments from Canada to the United States in the summer of 1999.

EMERGING ISSUES

1. Slipping demand for beef products – is a concern for all participants in the beef industry, especially with loss of value for hip and chuck cuts from the carcass.

2. The national identification initiative being lead by the Canadian Cattle Identification Agency will greatly enhance traceback capabilities for the beef industry in the long term. With a scheduled launch for January 1, 2001, a short term issue will be effective communication of this program to cattle producers.

3. Increased environmental pressures with respect to water quality and grazing cattle. A recent warning letter from Environment Canada to two cattlemen in eastern Ontario has sent an ominous warning to all cattlemen about cattle access to watercourses.

4. Antibiotic resistance - this issue is leading to more questioning of the use of antibiotics in livestock and poultry production systems.

5. Manure management - local concerns in rural areas of Ontario and throughout North America are causing all levels of government and industry groups to re-examine the regulations and management associated with the siting of livestock operations and the storage and land application of manure.

6. Food borne pathogens - are still a major public issue especially with media features about food borne pathogen such as *E. coli* 0157:H7, *Salmonella* sp. and Campylobacter.

DISTRIBUTION OF RECOMMENDATIONS TO AGENCIES

Recommendation	AAFC	ARIO	CCA	CARC	OMAFRA	Other
1. Consumer Issues (Food Safety, Meat Quality, etc.)	X	X	X	X		
2. Production Efficiency	X	X	X	X		
Non Service Recommendation						
Technology Transfer	X				X	

1999 RESEARCH & SERVICES RECOMMENDATIONS

TO AGRICULTURE & AGRI-FOOD CANADA, EASTERN REGIONAND
TO AGRICULTURAL RESEARCH INSTITUTE OF ONTARIO

TWO HIGHEST RESEARCH PRIORITIES

1. **CONSUMER ISSUES** - This area has been expanded to include meat quality and food safety, along with consumer issues (for example, safety of consuming livestock products from animals fed genetically modified feed). The beef industry needs to focus its research with the goal of meeting or exceeding the consumer's expectations with respect to food safety and beef quality every time. Cow calf, feedlot and meat science resources at the University of Guelph (including NLARS, RCAT and KCAT) and AAFC should be focused on a "conception to consumption" integrated approach to investigate the important determinants of meat quality. Consumer concerns with food safety appear to be rising based on the frequency of media stories on microbial contamination and negative stories regarding growth promotants . Research should identify genetic, management, slaughter and processing factors, which contribute to a consistently high quality and safe product. This initiative is a high priority and is vital for the future competitiveness of the beef industry.

PRIORITY B1

Recommended to the University of Guelph (including RCAT, NLARS and KCAT) through ARIO and AAFC stations through AAFC, CARC and CCA.

DETAILS

i. Investigate antibiotic resistant bacteria and potential contributions from antibiotic use in human medicine and livestock production.

ii. Initiate programs to develop new value added products from the hip and chuck areas of the beef carcasses that are convenient, safe, and consistent and improve the overall value of beef.

iii. Analyze the implications for feeding of new feedstuffs (i.e. genetically modified feeds) on animal performance, meat quality and consumer acceptance.

iv. Investigate options to develop on farm systems based on HACCP principles. There is a need to establish and validate critical control points on the farm and establish effective delivery systems for these programs to farmers.

v. From research and demonstration, develop a conception to consumer approach to quality assurance for the beef industry.

vi. Study the influence of on farm management factors and intervention strategies on the presence or absence of foodborne pathogens in cattle and beef.

vii. Develop and enhance vaccine and antimicrobial delivery systems to deliver effective doses to the animal while having minimal adverse effects on product quality. It has been suggested that work in this area focus on Bovine Respiratory Disease Complex (BRDC) and neonatal diseases in cattle.

viii. Support research to ensure that testing of beef products for drug residues remains effective, particularly for immune stimulator products and beta agonists.

ix. Examine options to modify the nutritional composition of beef through breeding, feeding or processing.

x. Investigate the effect of animal genetics, feeds, management and handling on beef safety and quality (marbling, portion size, tenderness, etc) and define production parameters for producers aiming for target markets (i.e. Canada Prime).

BACKGROUND

Recent studies indicate that beef quality, especially consistency, is a major issue to the consumers. Beef consumption has declined since peaking in the late 1970's. An industry wide campaign (Canadian Cattlemen: Quality Starts Here) to improve the quality and safety will hopefully increase the consumer's acceptance of beef, enhancing the market share for beef and ultimately benefiting Ontario and Canadian cattlemen and processors. This recommendation benefits both the agriculture production and processing sectors in Ontario and Canada.

In general, food safety remains a key issue for the entire food industry and for the cattle and beef sector specifically. Most of the discussions are focused on microbial pathogens. Increasingly, each participant in the food system is being asked to ensure that they have taken appropriate action to ensure the safety and wholesomeness of our food and that they can prove their actions through documentation, audit and verification procedures. While quality assurance and HACCP-based systems are being developed, there remains several questions about the role of various management practices on the farm with respect to whether animals are positive or negative as carriers of various pathogenic organisms.

Work is needed on the hip and chuck areas of the carcass. Demand for beef cuts from these parts of the carcass has slipped. New products that add value to these cuts while meeting consumer demands for consistency, quality and safety should enhance the overall value of beef carcasses in the market place.

These issues are important not just to researchers, cattlemen and processors but increasingly are involving consumer and media representatives. Advances in technology need to include the consumer and the public. This year saw debates about the safety of growth promotants and antibiotic resistance. Timely responses to this public debate are needed for the public to maintain its confidence in the food supply.

Beef quality includes all the attributes and characteristics that provide the consumer with satisfactory or better experiences when eating beef. The nine priority issues raised in the study "Re-engineering the Ontario Beef Industry for Competitive Advantage" help to define the issues that must be addressed in order to achieve Total Quality Management. The nine priorities identified are as follows: recognise the diverse marketplace, improve information - consumer to producer, improve consistency, address tenderness, address portion size, address quality and taste, develop new products, improve point of sale merchandising and ensure continuous improvement. There was a recognition that as the market becomes more differentiated, each market may have different quality requirements.

2. **COST EFFECTIVE CATTLE PRODUCTION AND BEEF PROCESSING** - Continued research is needed to provide new technological innovations and refinements that will improve the cost effectiveness and efficiency of Ontario beef farmers and processors.

PRIORITY B1

Recommended to the University of Guelph (including RCAT, NLARS and KCAT) through ARIO and AAFC stations through AAFC, CARC and CCA.

DETAILS

i. Develop siting guidelines for livestock access to watercourses as well as management approaches that allow riparian areas to be used for production while minimizing environmental impacts.

ii. Research into improved and cost effective strategies for nutrient management.

iii. Develop of systems to improve information flow between cow producers and feedlot operators and provide for a large scale, coordinated approach to breeding and management that will benefit all producers and processors in Ontario.

iv. Examine opportunities to improve feed efficiency and utilization in beef animals and develop programs for producers that effectively convey the differences between an animal

with a superior rate of feed conversion compared to an animal with a poor rate of conversion.

v. Assess the value of preconditioned and prevaccinated calves to cow calf and feedlot producers.

vi. Develop management approaches to reduce the need for antibiotics especially with the starting of animals on feed in the feedlot.

vii. Initiate research into "residue feeds" as a means to reduce feeding cost. Evaluate economic impacts, costs of fencing (permanent or temporary), effect on soil conditions next year and impact on next year's crop. In addition, consider animal production and quality aspect on the use of this feed.

viii. Genetically-engineered crops offer great potential for crop and livestock producers. As more feedstuffs are available as a result of biotechnological advances, there needs to be a review and study if necessary to ensure that feedstuffs do not adversely affect the quality or the safety of beef products.

ix. Continue research related to reproductive technologies related to beef cattle production systems.

x. Research basic and applied areas of bovine health to reduce losses associated with infectious conditions (clinical and subclinical) especially Bovine Respiratory Disease Complex (BRDC) and neonatal diseases (scours).

xi. Explore options for cost effective production systems.

xii. Develop siting guidelines for natural shelter areas (woodlots) used in the winter time. Research is needed to determine the management factors that minimize runoff and allow for adequate distribution of nutrients.

xiii. Examine animal welfare aspects of current production practices such as outside wintering of cattle, shade requirements in summer, alternate housing systems and issues surrounding transportation of cattle.

BACKGROUND

Improved cost effectiveness, efficiency and competitiveness are "moving targets". In other words, continued research is needed as the industry progresses and evolves. The economic importance of being technological leaders is critical in view of the GATT agreement and liberalisation of global trade. However, it appears that issues such livestock medicine use, animal welfare and environmental sustainability will become issues in future trade talks as well as being issues with domestic consumers.

HIGHEST NON RESEARCH PRIORITY

1. TECHNOLOGY TRANSFER **PRIORITY B1**

These recommendations should be forwarded to the appropriate Directors and Managers in OMAFRA and AAFC.

DETAILS

1.C ommunicate opportunities and responsibilities for producers associated with the national identification initiative starting on January 1, 2001.

2.E xplore options to maintain or enhance benchmarking services for beef producers on financial and/or herd performance. This work should be a co-operative effort with agri-business, researchers, OMAFRA extension staff, veterinarians, BIO, etc.

3.Dev elopment and enhancement of animal and carcass identification systems to link in with the Canadian Cattlemen's Association National Identification strategy which allow for feedback and traceback of information between cattle producers, packers and processors.

4.A "plain language" reporting and summarizing of research results is needed.

5.De velop a presentation summarizing various beef research topics, how this research has aided cattle producers, beef processors and consumers and current topics currently under investigation.

6.Suppo rt for a coordinated approach to breeding, managing and marketing cattle through the OMAFRA Mainstream Marketing program.

7.E stablish a corn silage variety testing program for Ontario producers.

8.Pr omote improved grazing management on beef farms through the Pasture Award, workshops, meetings and other venues.

9.T he development of version one of a Canadian Beef Cattle Information Database (Beef Infobase CD) has been completed. There is need for updating by appropriate extension personnel to ensure that factsheets and other technical information are complete and current.

10. Building deterioration is always a concern in livestock housing. New or improved materials and techniques are available to increase the life of a building. This information is available through OMAFRA engineers.

BACKGROUND

The Committee agreed that more opportunities for interaction between researchers and technology transfer agents were still needed. There also was recognition that extension personnel face a

variety of concerns and issues, some of which require leading edge research and others which require dissemination of proven technology.

EMERGING ISSUES

With current public sector fiscal cutbacks, concern was expressed that the supporting infrastructure needs to be maintained if our research programs are to continue. There needs to be a balance between funding allocated for individual projects and funding for the ongoing maintenance of the research facilities.

The meat trade, including beef, is starting to become more differentiated in terms of product quality (i.e. Grade "A" beef for those consumers who rank lean as a high priority, versus those people who prefer higher levels of marbling found in Canada Grade "AAA"). Marbling, portion size, ageing, cooking instructions are components being used to differentiate products in the meat case.

Concerns with food safety are becoming more prevalent in the media and with the public. These discussions focus on issues such as antibiotic resistance, on farm HACCP systems, consumer acceptance of irradiated foods, quality assurance, medicated feeds, extra label drug use, E.coli 0157:H7, etc. Many questions remain unanswered about how farm management factors can influence the presence or absence of microbial pathogens. Part of the farm and processing sectors response to these challenges includes audit and verification procedures.

Manure management issues are also very topical. Discussions include available land base for spreading manure, siting of new livestock facilities, surface and groundwater quality issues, odour and nutrient management planning. Throughout North America, governments and livestock producers are attempting to address these issues through nutrient management planning initiatives that indicate that there is an adequate land base for the spreading of manure and that manure will be managed in an appropriate fashion. These programs are being offered as industry programs, municipal by-laws (for the siting of barns) and provincial/state regulation and legislation.

COMMITTEE ACTIVITIES

The Committee met in June 1999. The meeting was used as a priority setting forum for the Ontario Beef Research and Services Subcommittee.

Ontario Beef Cattle Research and ServicesSubcommittee Membership (1999)

Six representatives appointed from industry, service and research sectors.
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Vice Chairman: Tom Hamilton, New Liskeard Ag Research Station, KCAT, University of Guelph

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STATE OF THE ONTARIO CATTLE INDUSTRY

CATTLE FARMS

- approximately 33,000 Ontario farms have beef or dairy cattle
- there are approximately 9,000 registered dairy producers in Ontario, leaving about 24,000 farms raising beef cattle (based on 1996 census)

DAIRY COWS

- the dairy sector contributes to the beef and veal industry through the production of dairy calves which go primarily to veal production and cull milking cows
- the culling / replacement rate in the dairy sector is about 30%, compared to a range of 9-14% in the beef sector
- even though there are about the same number of beef and dairy cows in Ontario, 3 out of every 4 cull cows are dairy
- dairy cow numbers peaked in Ontario and Canada in the early 1950's and have trended downward since then
- Ontario has slightly fewer dairy cows than Quebec (405,000 vs 472,000), however, the two provinces combined have over 70% of the dairy cows in Canada
- veal production has trended down over time, reflecting fewer dairy cows, but is influenced by the beef production cycles

BEEF COWS

- Ontario has about 440,000 beef cows or about 9% of total beef cows in Canada
- Ontario's share of the national beef cow herd has ranged between 9% and 12% over the last 35 years
- Alberta and Saskatchewan account for approximately 67% of total beef cows in Canada
- beef output is characterized by production cycles (normally about 10 years), driven by decisions of beef cow herd owners to expand or liquidate breeding cow numbers (reflecting profitability)
- 35-40% of beef cows are located in the counties in Western Ontario
- Eastern Ontario's share of beef cows is now second largest in Ontario, and has grown from 15% to 22% over 30 years
- the average beef cow herd in Ontario has been is 20 cows, although a few herds have 150+ head
- almost half of all the beef cows in the province are in herds of 18-47 head
- since the mid 1980's, growth rate in beef cow numbers has been higher in Western Canada than Eastern Canada

CATTLE FEEDING

- cattle feeding activity is concentrated in a relatively few number of operations
- while Ontario recorded over 2,000 cattle feedlots in the 1996 census, only 40 reported 700 head or more on feed at time of census (excludes backgrounding)
- fed cattle production in Ontario peaked in the late 1970's and trended downward since then
- fed cattle production in Ontario declined by 45% from the 1970's to the early 1990's, but appears to have reversed the trend in the late 1990's

SLAUGHTER / PROCESSING CAPABILITY

- beef packing capacity in Ontario exceeded cattle supplies until the mid 1990's
- in the late 1970's, Ontario had single shift packing capacity to process 20-25,000 head/week
- in 1999, federally inspected slaughter plants in Ontario can process about 14,000 cattle and calves/week (12,500 cattle and 1,500 calves)
- provincially inspected slaughter plants have capacity to process about 3,500 cattle and calves/week (2,000 cattle and 1,500 calves/week)
- one plant in Ontario, which only processes fed cattle, accounts for 60% of federally inspected cattle slaughter and 70% of fed cattle slaughter in Ontario

FARM CASH RECEIPTS

- Ontario accounts for about 15% of the farm cash receipts from cattle and calves in Canada, down from 31% in 1979
- Cattle and calf production is the second largest commodity in Ontario (behind dairy) accounting for 13% of total Ontario farm cash receipts - down from 28% in 1979

FINANCIAL PERFORMANCE

- Beef production must compete for land which has alternate uses
- Over the last 25 years, acreage of improved pasture in Ontario has fallen by 55%, acreage of oats/barley/mixed grains has fallen by 50%, and acreage of fodder corn has fallen by 50%
- Soybean, corn and wheat production in Ontario have increased at the expense of pasture, corn silage and small grains production
- Net Farm Income per tillable acre for cow calf production is the lowest of all 5 major agricultural land uses in Ontario
- Net Farm Income as a percent of Value of Production for cow calf operations is the lowest of 5 major agricultural land uses in Ontario
- Cow calf and beef feedlot production generate the lowest and 2nd lowest return on equity respectively of 5 major agricultural land uses in Ontario
- Beef cow production in Ontario is being relegated to land which is unfit for higher value crop production or where off-farm income can maintain an acceptable standard of living
- Beef feedlot production in Ontario is land based and located primarily in areas where corn and soybeans now can be grown (due to development of shorter maturity varieties)
- The relatively higher return on equity to cash crop and swine production has contributed to shifting resources out of cattle feeding in Ontario

PRODUCTION / TRADE ENVIRONMENT

- Beef cattle production operates in a free trade environment on a world basis (i.e. no import tariffs or quotas)
- There are no barriers to entering production (i.e. quotas) and the marketing of cattle is not regulated
- Prices for feeder cattle and fed cattle are determined on a North American basis
- Canada is a significant net exporter of cattle/beef (about 25-30%), with 90% of exports going to the United States and most of the remainder to Pacific Rim countries and Mexico
- Ontario is the second largest producing province in Canada in cattle feeding and slaughter
- Ontario is only about 50% self-sufficient in beef production relative to beef consumed in the province
- Ontario beef cattle producers must compete with counterparts elsewhere in North America
- U.S. producers initiated a countervail (CVD) and dumping (AD) trade action against live cattle exports from Canada in late 1998. The U.S. Department of Commerce has made preliminary rulings that a CVD duty is not warranted, but have initiated a 4.73% dumping duty on live cattle exports effective July 8, 1999.

SIGNIFICANT MILESTONES IN EVOLUTION OF BEEF PRODUCTION IN ONTARIO

- Prior to 1970, the Canadian and U.S. beef industry were focussed on producing high quality beef from English breeds with significant amounts of external fat cover
- The grading system in the U.S. has always had a major focus on marbling as a quality criteria
- Up to 1972, the focus of the Canadian grading system was conformation and uniformity of fat cover (marbling was not evaluated)
- Ontario had established its role in cattle feeding in the 1950's and 1960's based on the efficiency of feeding corn silage based rations to Hereford / Shorthorn / Angus cattle - adequate fat cover could be achieved with a silage based ration
- Growth in cattle feeding in the 1950's and 1960's in Ontario was based on sourcing feeder cattle from Western Canada (300,000 to 450,000 head/year)
- The Ontario beef cow herd supplies about 335,000 feeder calves/year or only about 55% of current fed cattle marketings in Ontario
- In the late 1960's, a major milestone occurred in Canada when the program to import European breeds was initiated
- A second major milestone occurred in 1972 when the Canadian beef grading system underwent major changes to focus on lean content (marbling was not evaluated)
- Cholesterol / fat intake became a significant concern of consumers in the 1970's with red meats being targeted as a contributor
- Through the 1970's, 1980's and 1990's, the percentage of European breeds in the basic cow herd increased continuously due to dominant use as sire breeds and retention of resulting offspring

- Cattle feeding in Ontario in the 1980's went into decline for a number of reasons:
    - increasing competition for available feeder cattle in Western Canada from feedlot expansion in Alberta
    - farm debt crunch
    - lack of expertise in managing financial risk
    - inability to finish crossbred cattle on silage rations
    - escalation of subsidies for grain / oilseed crops
    - exclusion of farm fed grains from grain subsidy programs
- By the early 1990's, the silage feeders were gone and what remained were cattle feeders focussed on feeding high grain rations to short keep cattle
- The need to compete and cheapen the overall post weaning gain drove weaned calves into backgrounding programs as opposed to feedlots
- The expansion of cattle feeding in Alberta far exceeded the decline in Ontario and Canada became a net exporter of fed cattle to the U.S. in the mid 1980's
- In 1992, Canada introduced marbling as a beef grading criteria, in part driven by the need to produce cattle which would meet the U.S. beef grade criteria and in part to address beef quality issues which were identified due to:
    1. t rend to lean carcasses
    2. c hanges in plant processing technology and speed which negatively impacted tenderness
    3. c hanges in retailing
- Animal welfare / rights issues surfaced as consumer issue in the 1970/80's
- Environmental issues related to surface and ground water pollution; manure disposal has become a limiting factor to expansion of many existing feeding operations
- With only one major processor for fed cattle in Ontario, and two minor processors, the presence of U.S. buying competition from firms such as Moyer, Taylor, Packerland/Murco and IBP has become critical to maintaining competitive prices

ONTARIO BROILER INDUSTRY RESEARCH AND SERVICES COMMITTEE

EXECUTIVE SUMMARY

This report was prepared based on the discussions held at the annual meeting. At that time, meat quality/ food safety, health and diagnostics, condemnations, epidemiology/data analysis, and environmental issues were identified as priority items. This report is virtually identical to the previous year's recommendations with some minor updates to better reflect the current needs and current state of research. There was recognition of a need for a larger integrated approach that linked production-based research with food safety and quality issues; that research efforts be closely tied to potential end users and ensure that the research is meeting their needs; and that new technology can be readily adopted when it becomes available.

Industry, government and university must ensure adequate teaching facilities and faculty to promote/maintain the core of expertise in poultry management, health and diagnostics and also ensure adequate diagnostic facilities and expertise to service and protect the health status of the industry. There continues to be a need for a system of co-operation and communication to promote interdisciplinary contacts regarding food safety, consumer health aspects, worker health/safety and environmental sustainability, to develop new markets and marketing strategies, to develop new products promoting health and quality and to enhance food quality and safety.

INTRODUCTION

The timing of the broiler committee was scheduled to coincide with the meetings of the turkey and egg committees on September 1, 1999. The three committees spent some time in joint session to discuss areas of mutual concern and the poultry research projects funded by the Animal program, under the OMAFRA/University of Guelph agreement.

STATE OF THE INDUSTRY

Ontario broiler production is a multi-level chain comprised of approximately 75 pullet growers and hatching egg producers, 8 hatcheries and 1100 broiler producers. There has been increasing interest from dairy farmers to switch to the broiler industry. There is a tremendous amount of new construction and renovation with the trend aiming towards larger units particularly in the hatching egg sector.

Global trade talks are scheduled to begin late in 1999 and the outcome of these negotiations will be the key to the future success of the Canadian chicken industry. Nationally, negotiations are continuing on the level and distribution of allocation and provincially, the Ontario board is now considering changing the way to distribute additional allotments to Ontario chicken farmers. The imported hatching egg supply was unusually tight early in the year, resulting in high prices from US suppliers, but returned to more normal levels in late spring. This was offset by flock life extensions and increased placements in Ontario flocks. The record hot summer weather decreased overall production levels and hatchability in the Ontario breeder flock base and resulted in some mortality in both breeder and broiler sectors but, in general, producers were better prepared than previous summers.

Gross Sales:

Hatching egg producers:	$55 Million to hatcheries
Hatcheries	$90 Million to producers
Feed	$220 Million to producers
Live bird sales	$420 Million to processors

The total value of the Ontario broiler industry would be in excess of $4 billion per year and includes the job value of allied industries, distribution, etc.

EMERGING ISSUES

In 1999 the industry faced many challenges on different fronts.

The issue of "J" virus myeloid leukosis is being resolved in elite and parent broiler breeder stocks, and now has less effect on liveability and supply for the more recently placed flocks. There are still questions as to the impact the virus may have had on broiler productivity over the past few years and on current production. Other disease issues that continue to be major problems to the industry are cellulitis and other *E. coli* infections, ascites, runting/ stunting and early mortality.

HACCP is a reality for all larger processors and the live sectors (breeders, hatchery and growers) are well on the way to instituting HACCP based programs. However, HACCP in live product is purely an exclusion program. There is no effective method of treating or even streaming the product once it becomes positive. The live segment of the industry is badly in need of new and scientifically proven methods of true control of bacterial pathogens of significance to food safety with respect to any point in the live production chain prior to entering the processing plant. There are also large gaps in our ability to perform quantitative assessment of the risk that an isolation of such potential pathogens as *S. enteritidis* and *S. typhimurium* DT104 poses to components of the broiler meat chain.

The increased demands for higher production levels, less downtime, and higher densities are coupled with increasing demands for "safe" products and reduced bacterial loads on live product entering the plant. These challenges are compounded by the possible loss of additional antibiotics or severe restriction in use due to worries about possible increased antimicrobial resistance levels in potential pathogens. In addition to the need of determining agriculture's true role in antibiotic resistance, there is a need to identify possible alternatives/replacements for antibiotics in therapeutic and production applications.

The needs of the broiler breeder sector in terms of research on specific management techniques, egg production, hatchability, embryology and chick quality hopefully will be met by the expanded commitment by the University of Alberta to this specific field.

RESPONSE TO 1998 RECOMMENDATIONS

Recommendation #1: Food safety and quality	**AAFC**: Research is ongoing on chemical and microbial food quality re methods of detecting salmonella in poultry facilities and methods for differentiating species of Bifidobacteria (a group of probiotic bacteria). **U of Guelph:** Leeson, S: Manipulating composition of poultry meat and eggs relative to issues of food safety and improved human nutrition. Smith, T: Effect of feed borne Fusarium mycotoxins on meat quality in broilers and turkeys and potential for dietary treatment of these effects. Barbut, S: Enhancing the safety and quality of poultry products.
Recommendation #2: Poultry health and diagnostics	**U of Guelph:** Barta, J: Evaluation of DNA-based methods for eliciting immune response in chickens against coddidiosis. Nagy, E: Molecular biology and pathogenesis of avian viruses and development of recombinant vaccines and diagnostic procedures. Squires, J: Prevention of pulmonary hypertension and ascites in poultry. Squires, J: Causes and treatment of fatty liver hemorrhagic syndrome in layers. Widowski, T: Investigating the effects of alternate light sources on behaviour and performance. McMillan, I: Evaluation of heritability of acute and chronic heart failure in broiler parent strains. Barta, J: Effect of genetic diversity of parasites on immunity to coddidia. Fernando, A: The dsRNA virus of *Emeria necatrix* in the chicken: pathogenicity and immunity. Fernando, A: Analysis of intraspecific variation among *Elm eria sp.* Gyles, C: A vaccine against *E. coli* infections in broilers.
Recommendation #3: Poultry welfare	**AAFC**: The Agassiz group carries work in relation to efficiently producing safe poultry products (meat and eggs) using Canadian cereals and by-products with a minimum impact on environmental and well-being of bird. A Recommended code of practice for the Care and Handling of Farm Animals - transportation, developed under the auspices of Canada Committee on Animals is nearing completion. **U of Guelph**: No response.
Recommendation #4: Data analysis	**AAFC**: It may be worthwhile to refer to the Poultry Industry Council (PIC) on this recommendation. **U of Guelph**: No active projects. The poultry epidemiologist resigned, so there is not a qualified person available to do epidemiology research. The University is reviewing the faculty position.
Recommendation #5: Environmental issues	**U of Guelph**:Lees on, S: Optimizing poultry nutrition and feed management in terms of production efficiency and environmental management.

RECOMMENDATION #1 **PRIORITY 1B**
TO AAFC, U OF G

FOOD SAFETY

GOAL To improve the quality and safety of chicken meat, thus enhancing consumer confidence and acceptance of chicken and chicken products.

OBJECTIVES

1. Risk assessment at each and all levels of the production chain. Determine the impact of enhanced control measures at each point and develop cost benefit analysis for such measures.
2. Reduction of microbial load in the live animal supply to processing. Continue the development of methodology for rapid detection and quantification. Develop new and innovative methods that provide a level of true control (or acceptable treatment/ elimination in infected flocks) for bacteria of significance to food safety.
3. Continue the development of methodology for the detection, control and reduction of drug residues and other possible contaminants in chicken and products. Determine the impact on resistance levels in microbes.
4. Investigate alternative medications and innovative preventative regimes (e.g. competitive exclusion).
5. Develop innovative poultry products through innovative feeding regimes or genetic engineering. This could be in reference to inclusion of "health" additives (e.g. omega 3 fatty acid, vitamin analogues), in reference to improved detection of hazards (e.g. bone fragment detection) or in reference to improved quality/uniformity/shelf life fresh product.

BACKGROUND

Consumer concerns about food safety appear to be rising based on the frequency of media reports. As poultry has been targeted specifically in the past, the subject of food safety has become the foremost issue of concern in all segments of the poultry industry. It is vital for the future competitiveness of the poultry industry to maintain consumer confidence and meet or exceed consumer expectations with respect to food safety and product quality. The industry must be proactive in developing new and fully integrated approaches with elements of true control to ensure a consistent high level of safety with respect to potential pathogens and contaminants. Product emphasis must be on high quality addressing consumer concerns for food safety, health promotion, nutritional aspects as well as cultural and convenience preferences while developing new specialty, new flavour, niche, value add or shelf stable foodstuffs for a global market.

RECOMMENDATION #2 **PRIORITY 1B**
TO AAFC, OMAFRA, U OF G
POULTRY HEALTH AND DIAGNOSTICS

GOAL To conduct research to improve the health of poultry and diagnostic ability for the industry.

OBJECTIVES

1. To research and develop rapid, accurate, efficient and inexpensive methods of diagnosis, subtyping and specific agent subgroup identification dealing with the viral and bacterial diseases of significant economic importance to the industry. To provide these services to the industry at the commercial level.

2. To research pathogenesis and techniques for the prevention and control of those diseases of prime economic importance to the poultry industry whether infectious or metabolic in origin; for example (but not limited to) cellulitis, coccidiosis, colibacillosis, ascites, respiratory disease complex, infectious bursal disease and laryngeotrachitis.
3. To investigate alternative methods of improving liveability and general health without sacrificing productivity; for example, the role of diet in immune status, prevention of metabolic disease and reduction of mortality.

BACKGROUND

The poultry industry has very few treatment regimes available presently and with current policies and requirements, the introduction of new drugs and chemicals registered for poultry is unlikely. This is coupled with the consumer's fear of residue and increasing demand for "drug free", organic and "natural" meat products. To maintain the health, productivity and liveability of the flocks and also maintain the quality and grade at the slaughter facility, the poultry industry must depend on prevention, early diagnosis, husbandry support and containment of diseases whether infectious or metabolic in origin.

At this time the industry is severely disadvantaged in its ability to identify viral subgroups. Timely rapid accurate agent identification is vital as the first step in adjusting or redesigning present prevention/treatment regimes, in responding appropriately and rapidly to emerging problems and in developing new control procedures. The resources and support must be allocated to allow projects such as the development of PCR techniques to reach the stage where they will be able to service the industry. Despite repeated recommendations in this area, this request has not yet been addressed.

Continued and increased support of the Poultry section of Animal Health Lab at U of Guelph is needed to research, develop and provide diagnostic services to the poultry industry especially in regard (but not limited) to histopathology, serology, virus isolation, DNA probes and PCR techniques, mycoplasma monitoring and isolation. The industry depends heavily on the services, specialized expertise and the technical and educational extension from the poultry team at AHL.

Infectious and metabolic disease are still a significant economic cost to the industry both in mortality and in condemnations. "New" diseases and disease strains are constantly being discovered in the world and although Canada is reasonably isolated, the possibilities of introduction still exist (the most recent example is the "J" virus).

RECOMMENDATION #3 **PRIORITY 1B**
TO: AAFC, U OF G

POULTRY WELFARE

GOAL To research strategies in poultry management and transportation systems, which will reduce condemnation levels while also reducing bacterial contamination and improving poultry welfare.

OBJECTIVES

To assess and quantify the impact of management systems, housing design, handling, crating and live haul transportation systems on the quality of poultry meat, the level of condemnation/downgrading/trimming (e.g. DOA, bruising, dermatitis, cellulitis, CRD) and on the shedding and cross contamination of potentially pathogenic organisms.

To find new technological innovations and refinements to reduce cross contamination and improve cost effectiveness and efficiency while improving animal welfare.

BACKGROUND

There are significant losses to the industry yearly in DOA's, bruising, cyanosis, downgrades and condemnations at the processing plant due in large part to the type, design and method of handling, transportation and to environmental factors associated with housing design and operation. This is more than an economic issue, it is also a quality issue in terms of meat salvage and aesthetics, a food safety issue in terms of stress shedding of pathogenic organisms and reduced shelf life, and a welfare issue in terms of humane practices and adequately meeting live bird needs. The industry is interested in being proactive in addressing welfare concerns and requires factual scientific data on the needs of poultry to improve the present systems and also to respond adequately to critics.

RECOMMENDATION #4 **PRIORITY 1A**
TO: AAFC, OMAFRA, U OF G

DATA ANALYSIS

GOAL To establish a central data analysis/information network to allow tracking, epidemiology and fulfillment of export requirements. To provide continuous extension service support to the industry through a Poultry health services network.

OBJECTIVES

1. To arrange the compilation and analysis of data from the field to investigate: the epidemiology of specific disease occurrences,
   - the epidemiology of condemnation trends,
   - the effect of management trends and prevention/health programs on the health and performance of the Ontario flock,
   - the effect of new quality assurance and HACCP programs on contamination rates and overall flock health (and ultimately on consumer health and complaints),
   - the economic and market factors affecting industry structure and global competitiveness.
2. To track certain diseases' occurrence in order to meet specific countries' export requirements for fresh and frozen product.
3. To formalize a network of academic and industry researchers and health professionals for better communication, coordination and information flow. This would allow an integrated approach, a more effective "needs" development, encourage cooperative research projects and industry $ support, and encourage rapid and appropriate application of research findings.

BACKGROUND

The poultry industry has evolved over the years into a very precise and detailed data collection system, recording everything imaginable, primarily on electronic/computerized devices. This system produces a huge amount of data yearly and would be a wealth of information if compiled and analyzed. The designing and development of a centralized collection system with third party independence, appropriate epidemiological expertise and statistical capabilities would leapfrog the industry into the 21st century. It could also provide a central clearinghouse for educational and technical information release and exchange. The poultry industry expects OMAFRA to play a major role in providing provincial disease tracking capabilities and to provide extension services to the industry.

RECOMMENDATION #5 **PRIORITY 1A**
TO: AAFC, U OF G

ENVIRONMENTAL ISSUES

GOAL To encourage research on environmental issues, indoor and outdoor, and develop systems which reduce environmental impact as well as improve the performance, health, safety and comfort of poultry, and health and safety of poultry workers.

OBJECTIVES

1. To develop alternative methods of manure storage, pretreatment, application, disposal (value added) and dead animal disposal. To develop improved methods of sampling and testing manure to better determine application rates and the effect on soil and water pollution.

2. To develop technology to reduce any negative impact of poultry production on environment through reducing or balancing nutrient content, reducing odour, and improved feed utilization. Investigate feed formulations and/or novel feed additives as a means to reduce ammonia levels in barns, nitrogen and phosphorus excretion, reduce volume, and to produce a more amenable end product.

3. Assess and quantify the environmental effects and ergonomics of poultry housing, handling and transportation systems on the health and welfare of poultry workers.

BACKGROUND

There is growing concern in areas of Ontario as to the compatibility of high density poultry production and urban encroachment. Alternative methods of manure handling, storage and disposal or possible pretreatment of litter or manure need to be investigated. Feeds need to be formulated on the basis of available amino acids and other essential nutrients as a means of reducing ammonia levels in the barn, nitrogen and phosphorus excretion in the manure and reduced volumes to prevent pollution and produce a product more amenable for crop or garden/lawn fertilizer or as an alternate feed source.

There is also room for investigation of rural sociology to better understand and develop "good neighbour" strategies between commercial poultry production and the growing rural population.

More and more poultry producers are becoming employers as well, and the needs and safety of their workers must be taken into account. There is need to assess and quantify the effects, risks and efficiencies of the environment and ergonomics of poultry housing, management, handling techniques and transportation systems on the health and welfare of poultry workers.

COMMITTEE MEMBERSHIP

Chair:

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ONTARIO DAIRY RESEARCH AND SERVICE COMMITTEE REPORT

EXECUTIVE SUMMARY

The ODRSC held it annual meeting on September 1, 1999. A brief review of the ODRSC mandate withing OARSC, OASCC and ARIO was discussed as part of the agenda for new members of the committee. The report prepared concentrates on establishing research priorities. Services priorities, where identified, are included in "Emerging Needs and Outstanding Issues". Communication of new research results and extension of known technology for adoption by Ontario dairy producers continues to be a concern of the industry. Research priorities remain similar to 1998, with a couple of modifications. The 1998 #6 research priority on "manure and milking center washwater treatment" has been deleted as a separate priority and incorporated into others. There was also discussion on research submissions related to "transient tingle voltage" and "corn silage quality evaluation" and these too have been added to existing priority areas. "Nutrition Strategies" and "Reproductive Efficiency" continue as the top two priorities. There are seven major research areas identified. Within each research area, priorities for support are identified.

The dairy industry is on a solid position overall. Consolidation to fewer but larger farms continues. The Dairy Farmers of Ontario (DF0) has initiated a research check-off and along with the provision of milk quota to the University research and teaching herds, is actively soliciting and supporting dairy research in Ontario.

INTRODUCTION

The Ontario Dairy Research and Services Committee is composed of representatives from all industry stakeholder's. (Appendix 2). Meetings are held annually to review the state of the industry, identify emerging needs and outstanding issues and set research priorities. This report summarizes the 1999 meeting and is similar in many areas to the 1998 report. Included in the report is a summary of research activity in the areas identified in the 1998 Report to OARSC, Committee Membership list, and an inventory of OMAFRA projects that are dedicated to dairy research in Ontario.

The Ontario Dairy Industry is responsible for the largest share of farm cash receipts to Ontario farmers. Because of the importance of the industry it is important that research funding be maintained or enhanced to support basic, long term research.

The animal research program was reviewed by ARIO in 1997 and a new four plan for 1998-2001 submitted. With the next ARIO review planned for 2001, the ODRSC will likely meet several times in 2000 to allow more time and thought in establishing longer term priorities for the 2002 - 2005 ARIO review period.

COMMITTEE ACTIVITIES

The ODRSC held its annual meeting in Guelph, at OMAFRA Head Office, on September 1, 1999. Several new members have been appointed by their respective organizations.

Dr. John Devenish is replacing Dr. Ahmed Afshar from AAFC in Ottawa. Dr. Helene Petit is replacing Dr. Anne Marie de Passille from the Lennoxville Agriculture Canada Research Station. Mr. Bob Kerr is replacing Mr. Bruce Whale from the Ontario Large Herd Operator's. Mr. John McCallum represented Ontario DHI at the meeting and will possibly be appointed their representative to replace Mr. Ron Versteeg.

The committee is very appreciative of the excellent input from the following retiring members:

Dr. Ahmed Afshar
Dr. Anne Marie de Passille
Mr. Ron Versteeg
Mr. Bruce Whale

STATE OF THE DAIRY INDUSTRY

Global Overview

Ontario's dairy industry continues its constant evolution within the global business environment. Trade liberalization, fluctuating currency values and changing supply and demand outlooks are all having noticeable effects on Ontario's dairy producers.

Near-record corn and soybean crops in North American have contributed to lower grain and feed prices. While parts of Western Ontario experienced near drought conditions in the early part of the summer, other parts of the province have enjoyed an ideal growing season and feed supplies are abundant.

Total milk production in Ontario increased by 0.7% during the dairy year ending July 31, 1999, to a record level 2.533 billion litres, despite declining herd and cow numbers.

Dairy Farmers Support Research

It is worthy to note that Dairy Farmers of Ontario (DFO) has significantly increased its support for research by establishing a separate research check-off effective March of 1998. This now means that DFO is contributing approximately $1,000,000 to dairy production, economic/policy, and food science research. A part of this contribution is provided in the form of a competitive fund that is open to proposals from the research community. Nineteen projects were approved for initiation in 1999 under this fund. DFO's research dollars are often matched, at least on a 1:1 basis, through NSERC and/or other government funding agencies, depending on the project.

In addition to this research, Dairy Farmers of Ontario also spends an additional $500,000 on advertising and promotional research in support of its marketing efforts in the product promotion area.

Other producer funding of research also comes from the milk recording, AI, and breed sectors as well as Dairy Farmers of Canada.

Economic Assessment

Milk continues to be first among commodities when ranked by value of farm cash receipts. The most recent data (1997) from the Ontario Farm Management Analysis Project (OMAFRA Publication '69) shows that the gap between top, average and low groups when ranked by net farm income (NFI) continues to cover a wide range. Among the 241 dairy farms summarized, the top 80 had NFI of $114,392, compared to the average of $62,051 and $17,079 for the lowest 80 farms.

Herd and Farm Profile

In July of 1999, 6,806 milk producers sold milk to Dairy Farmers of Ontario (DFO) compared to 7,072 a year earlier. There were also 149 cream producers in July 1999 compared to 173 a year earlier.

Strong dairy cattle sales to the U.S. continued to contribute to a decline in cow numbers during the year. Ontario DHI statistics show average production in Ontario milk recorded herds is now 8,327 kgs of milk, 311 kgs of butterfat and 270 kgs of protein, with an average somatic cell count of 219,000. Sixty-six percent of herds in the Province are on some form of milk recording.

New dairy barn construction continues in Ontario, with new facilities being predominantly free-stall barns with bunk silos and in some cases, commodity sheds. An increasing number of these new facilities feature sand bedded free-stalls. Tower silos equipped with high capacity unloaders are also regaining popularity.

A new technique being employed by some producers this year is kernel "processing" of corn silage. A field unit chops and crushes the silage before it is stored. After fermentation is complete, "processed" silage is more digestible than regular silage. Trials have shown that "processed" silage can increase milk production by 0.75 to 1.25 kgs per cow per day.

Some seed companies have introduced silage specific varieties that address digestibility and palatability issues.

Milk Marketing Conditions

Over-production quota credits were introduced in Ontario beginning in December 1998. Two days of quota credits per month have been issued since December and are scheduled to continue until September. This is a transition period with the total allowable over-quota credits being 20 days after September 1999. These changes in the quota credits were designed to bring more harmonization in quota policies among the P5 provinces.

The study to examine issues affecting the Interpovincial Quota Exchange is underway. Approximately 1200 producers in Ontario received a questionnaire. A final report on this study is expected by the fall of 1999.

The U.S. and New Zealand launched a WTO challenge against Canada's use of its' special class pricing system for exports. The WTO Panel found that some parts of Canada's

special class system constitute an export subsidy. As well, the U.S. successfully challenged the administration of the tariff rate quota for fluid milk. Both of these findings are being appealed. Regardless of the outcome of the appeal, these findings do not impact the domestic milk supply management system in Canada. The issue in question is how the export of dairy products is handled within the marketing structure.

Average Provincial component tests stayed fairly constant for the dairy year ending July 31, 1999. Butterfat average for the year was at 3.9034 kg/hl compared to 3.9029 kg/hl a year earlier, while protein was at 3.3132 kg/hl compared to 3.3131 kg/hl the previous year.

Component prices for within quota shipments during July of 1999 were as follows: (July 1998 figures in Brackets) Butterfat: $5.22\kg ($5.26), Protein: $8.52\kg ($8.81), Other solids: $1.17 ($1.23)

EMERGING NEEDS AND OUTSTANDING ISSUES

1. **Corn Silage Quality Assessment**. The dairy industry continues to expand its use of corn silage as a major nutritional roughage source. However there is a need for more accurate and consistent nutritional feed evaluation. Ms. Beth Wheeler, OMAFRA Dairy Nutrition Program Lead, made a presentation (Appendix 5) to the Committee on behalf of the OMAFRA dairy and beef programs. The Committee is supportive of initiating a research program to evaluate the nutritional quality of corn silage as influenced by variety, management and climatic conditions in Ontario. It has been included in Recommendation #1 "Nutrition".

2. **Transient Tingle Voltage** DFO and OFA are supporting additional research into how transient tingle voltage affects livestock. There has been previous research at New Liskeard and other locations that concluded minimal long term impact on dairy cattle. However there continues to be problems in the industry associated with transient tingle voltage. Therefore this priority has been added to Recommendation # 5 on "animal welfare and behavior".

3. **Environmental Impacts of Large Production Units** There is public perception that large animal production units are associated with air quality, water quality and run-off problems. This is a growing concern that has led to some municipalities passing by-laws restricting expansion. There is a need to continue to support research and extension programs that address this concern and especially encourage producers to develop nutrient management plans (NMP's) for existing and expanding operations.

4. **Prescriptions for Feed Additives** This continues to be a concern for the feed industry. Additional nutritional research is required to determine if the increased levels of some nutrients (ie Se, Vitamin E, P, Vitamin D) and feed additives (ionophores) currently being requested by producer's and prescribed by nutritionists and veterinarians are justified and safe.

5. **Food Quality** Consumers and producers alike are concerned about food quality. It takes very little negative publicity to destroy an otherwise viable industry. Educational

programs at the producer, processor and consumer level need to be implemented to reduce the incidence of illness caused by food borne pathogens such as E. Coli 0157:H7, Salmonella sp. and Campylobacter. Antibiotic resistance also continues to be a concern that may ultimately impact on the use of antibiotics in animal production systems. The "Livestock Medicines Course", to be required by all livestock producers purchasing over the counter medications, is a positive step to ensuring that at the producer levels these products are being used properly. ODRSC has not included this as a research priority but considers this primarily an extension priority at the producer level. There are several robotic type milking systems in operation in Ontario now and increased interest in this technology. There may be milk quality issues that need to be evaluated, either through research or on-farm testing.

6. **Eastern Ontario Dairy Research Plan** Alfred and Kemptville Colleges are preparing a joint plan for use of their facilities for dairy research appropriate to the needs of Eastern Ontario. The Committee spent time addressing this issue. Many different ideas were discussed from concentrating all dairy research at Guelph with expanded more versatile facilities to expansion of research capabilities at all locations. Because of limited physical and financial resources, the concensus was that each location should continue to concentrate their research in areas of historical precedent. Such as manure and environmental management at Alfred and nutrition and animal management programs at Kemptville. The Committee does not want to discourage any research that would benefit the dairy industry in Ontario.

7. **Research technology transfer** This is an ongoing need. The committee is aware of the creation of a Dairy Extension Committee within Ontario and would appreciate more information on its establishment and reporting. It would be important for the ODRSC and Ontario Dairy Extension Committee to be sharing information.

RESPONSE TO 1998 RECOMMENDATIONS

Response
ARIO
Research Priority Areas (directed to ARIO):

5) Animal Welfare; 6) Manure Handling and Milk House Washwater Management; Decision Support Systems; 8) Housing Systems

The ARIO accepts the above priorities as the 1998 research priorities of the dairy subcommittee as directed to the ARIO. It is acknowledged that the content of these priorities remain the same as in 1997. In some instances the order in which they have been placed has changed. This will be taken into account by the University of Guelph in the next call for research proposals.

The current dairy research program at the University of Guelph supports the above priorities through work which can be done according to the following research objectives:

Priority 5: can be addressed through: Objective 8
Priority 6: Objective 7
Priority 7: Objective 4
Priority 8: Objective 6

The Objectives and Goals of the Dairy research program can be viewed at the university's web site at: http://www.uoguelph.ca/research/omafra/animals/objdairy.html

RECOMMENDATION #1 **PRIORITY 1C**
TO U OF G, OMAFRA, AAFC

NUTRITION & FEEDING STRATEGIES

To define cow nutrient requirements during stressful periods such as transition, early lactation and peak production. To research nutritional and feeding strategies that reduce feed costs and directly impact the production of milk components of high economic value, without compromising health, reproduction or milk quality.

BACKGROUND

The interrelationship of production, health and reproduction in dairy cows is now better understood and yet little research is devoted to data collection and analysis of these variables simultaneously. Many nutrient requirements used in ration formulation today are based on production levels, management systems and research investigations of 20 or more years ago and may not reflect the nutrient needs of the cow today or in the future. There are also concerns related to the use of single group TMR's, silage processing effects on fibre levels and mineral levels fed relative to NRC requirement.

DETAILS

1. Nutritional studies of cows experiencing the stresses of calving, early lactation and high production, which circumvent reproductive and health problems, should be conducted.

2. Research is needed to redefine the nutrient requirements of the modern cow, during critical life stages such as transition and early lactation, while determining allowances for health and reproductive performance.

3. Research is required into "on farm" feeding systems comparing the impacts of single and multiple group TMR's and silage processing and the effects of by-product fibers on required fibre in rations to maintain animal health and desired milk component levels. Assessing the impacts of mineral levels formulated relative to NRC nutrients is an Ontario issue.

Response
***AAFC*:** The Dairy and Swine Research and Development Centre at Lennoxville focuses on improving the productivity and profitability of dairy production in Canada. The scientific output of the ruminant researchers at the Lethbridge Research Centre also have significant and direct

impact on dairy nutrition and feeding strategies. The details as contained in this recommendation are related to both the Dairy and Swine Research and Development Centre and the Lethbridge Research Centre for them to take into consideration vis-a-vis their research programs.

UNIVERSITY OF GUELPH: These details are being addressed in the following projects:

Project No.	Project Leader	Project Title
22850	McBride, B.	Strategic supplementation and intake behaviour of diary cows
22910	Kelton, D.	Investigations of the health, nutritional, genetic and environmental attributes of routine milk acetone determinations in Ontario dairy herds.
23100	Sharpe, P.	Animal performance on pearl millet and sorghum feeds
15250	Grovum, W.L .	Managing high producing cows to avoid ruminal acidosis.
16290	McBride, B.W	Nutrition to promote health of the cow and to produce healthful dairy products
16300	Cant, J.	Finding a description of milk synthesis adequate to manipulate milk composition.
16440	McKnight, D.	Animal feed from woodpulp combined biosolids
18830	McKnight, D.	Effect of a Probiotic/Yeast Supplement on Performance of Transition Holstein Cows
18850	Mallard, B.	Mechanism(s) of Immunomodulation by Organic Chromium (III) in Peripartum Dairy Cows: Impacts on Health and Performance of the Cow and Calf
18880	Osborne, V.	Altering Water Quality and its Effect on Dairy Cow Performance and Oxidative Status
18910	Sharpe, P.	Metabolism and Fertility in Dairy Cattle

Further details on the above projects can be found at the University website at: http://oasis.uoguelph.ca/

RECOMMENDATION #2 **PRIORITY 1B**
TO U OF G, OMAFRA, AAFC

REPRODUCTION/GENETICS

To support research to increase the reproduction efficiency of dairy annimals that will elucidate factors affecting reproduction in the high producing cow. To conduct a cost benefit analysis of the application, economic potential, conduct and acceptance of research in dairy molecular genetics.

BACKGROUND

Extended calving intervals and reduced longevity due to culling for reproductive failure are problems on Ontario dairy farms. The trend toward higher production levels puts addition pressure on the diary producer to get cows pregnant. Research in other species has used molecular genetics to alter carcass quality and to reduce phosphorus excretion. Similar opportunities exist in dairy cattle research in molecular genetics. Since this research is long term and expensive, investigation of the opportunities for Ontario's dairy community to benefit from studying molecular genetics is necessary. Preliminary technology now exists to also consider cloning as a means of rapidly increasing the frequency of more desirable genotypes in the cow population.

DETAILS

1. To refine the techniques for programmed breeding, especially with high producing cows.
2. To study oestrus detection, insemination times and techniques, especially as they relate to effects of nutritional ie: minerals and other stresses on ovarian function, reproduction and culling.
3. With additional funding, studies to collect oocytes, improve the success of in vitro fertilization and refine semen sexing, embyro splitting, cryoperservation and cloning techniques should be encouraged, in cooperation with federal researchers working in the same area of emphasis.
4. Research in molecular genetics is long term and expensive. It can provide a link to quantitative genetics and identify opportunities for producers to fill a niche market in the production of milk that has been genetically altered. It may be necessary to create a development position to examine this, as it is unclear as to whose mandate it is to conduct a cost benefit analysis of molecular genetics.

Response

AAFC: The Dairy and Swine Research and Development Centre at Lennoxville focuses on improving productivity and profitability of dairy production in Canada. Through ovarian physiology research, embryo production can be improved at any stage of the estrus cycle in cattle. A new program developed with Alliance Boviteq Inc. allows more efficient management of the operations of the embryo transfer centre. Gestation rates of more than 50% are now obtained after the transfer of frozen embryos of determined sex. While not directly involved in transgenic nor cloning research, the usefulness of a coalescence of quantitative and molecular genetics is recognized with the secondment of a federal scientist to work at Guelph. The issue of the conduct of a cost benefit analysis of molecular genetics is unclear nor the player(s) who will conduct such an analysis. Moreover, molecular genetics is a very broad field. If a cost benefit analysis is to be carried out, it may be better directed to a specific research topic rather than molecular genetics in general. An upcoming national dairy meeting in late January 2000 may be an appropriate forum for this to be re-visited collectively. The specific details as contained in this recommendation are related to the Lennoxville Centre for them to take into consideration vis-a-vis their research programs.

UNIVERSITY OF GUELPH: These details are being addressed in the following projects:

Project No.	Project Leader	Project Title
22660	Pollard, J.	Dev. of embryo culture systems for optimization of heifer calf production following cryopreservation & transfer on invitro derived embryos
23380	Walton, J.	Cloning Elite Dairy Cattle
23600	Jansen, G.	Intensive Dairy Cattle Breeding Strategies
15200	Walton, J.	Programmed breeding of dairy cows.
16250	Leibo, S.P.	Derivation of an improved method to cryopreserve bull spermatozoa
16280	Walton, J.	Endocrine regulation of early pregnancy in cattle.
16470	Jacobs, R.	Identification of genomic virulence markers in bovine viral diarrhea virus (BVDV) type II
16860	Gentry, P.	Function of proteinase-type proteins in regulation of ovarian follicular development in dairy cows
18760	Buhr, M.	Predicting and Improving the Fertilizing Ability of Frozen Thawed Bull Sperm
18790	Gibson, J.	Detection and Utilization of Molecular Marker-QTL Associations in Dairy Cattle

Further details on the above projects can be found at the University website at:
http://oasis.uoguelph.ca/

RECOMMENDATION #3 **PRIORITY 1C**
TO U OF G, OMAFRA, AAFC

GENETIC EVALUATION

To continue refining Canada's dairy sire and cow genetic evaluation systems.

BACKGROUND

Dairy producers are using Canada, US and internationally proven bulls in their breeding programs; however, even within the Canadian system for sire and cow genetic evaluation system there are some concerns as to whether or not particular situations are adequately accounted for in the calculations. In particular, those related to herd housing method and preferential handling of full dams needs to be addressed. Changes to the systems to improve the repeatability of breeding values would be of significant value to the industry.

New technologies, such as gene markers, are emerging, which to date, have not been utilized in the current genetic evaluation system for sires and dams. The utilization of such information needs to be evaluated in terms of improving the repeatability and acceptance of genetic indices.

DETAILS

1. To test and validate variations to the current systems utilizing such approaches as the test day model to improve the repeatability of breeding value indices.

2. To determine the suitability of new technologies, such as gene markers in the refinement of dairy sire and cow evaluation systems.

Response

***AAFC*:** A federal research scientist from the Dairy and Swine Research and Development Centre at Lennoxville is seconded to work at Guelph. His research program however relates only to (a)identification of the relationship of molecular markers to economic traits: (b) development of computer programs for testing marker-QTL relationship; (c) development of breeding strategies for integrating quantitative and molecular genetics; and (d) determination of sample size required for DNA genotyping and investigation of the factors affecting the require sample size.

UNIVERSITY OF GUELPH: These details are being addressed in the following projects:

Project No.	Project Leader	Project Title
23600	Jansen, G.	Intensive Dairy Cattle Breeding Strategies
16270	Schaefer, L.	Upgrading genetic evaluation systems for dairy cows and bulls in Ontario
18860	Mallard, B.	Genetic Regulations of Immune Responses During the Periparturient Perio and Associations with Health and Performance of Holstein Cows
18790	Gibson, J.	Detection and Utilization of Molecular Marker-QTL Associations in Dairy Cattle

Further details on the above projects can be found at the University website at:
http://oasis.uoguelph.ca/

RECOMMENDATION #4 **PRIORITY 1C**
TO U OF G, OMAFRA, AAFC

HEALTH

To encourage research that identifies the incidence, prevalence and impact of infectious diseases such as mastitis, abortion associated with Neospora and Papillomatous Digital Dermatitis, that will lead to the development of effective bio-security programs for Ontario dairy herds.

BACKGROUND

Diseases caused by bacteria and viruses impact on productivity of Ontario dairy farms. Mastitis, measured by bulk tank and DHI SCCs, remains prevalent. Lowering SCCs remains a DFO priority. Adoption of recognized measures for control of contagious mastitis remains an issue

for many farms. The identification and implementation of methods which effectively and economically prevent environmental mastitis remains a research priority.

Abortions associated with Neospora and lameness caused by Papillomatous Digital Dermatitis (Strawberry Foot) are increasingly reported in veterinary herd surveys and laboratory surveillance data. The extent and economic impact have yet to be documented. There is need for on-farm research into the patterns and the impact these diseases have in Ontario's dairy herd. Ongoing access to representative herds, for studies such as those being conducted on mastitis through the "Sentinel: project, is essential.

Ultimately, there is increasing evidence that producers and veterinarians need information on disease patterns and effective management strategies to protect dairy herds from infectious diseases and the use of this information to develop herd bio-security programs is a critical step.

Response
UNIVERSITY OF GUELPH: These details are being addressed in the following projects:

Project No.	Project Leader	Project Title
22840	Jacobs, R.	Pathogenesis of the hematological effects of acute type II bovine virus diarrhea (BVDV) infection.
22920	Leslie, K.	Evaluation of Methods for the Early Detection of Health and Production Problems in Periparturient Dairy Cows
15230	Leslie, K.	Evaluation of methods to eliminate and prevent intramammary infection in dairy cattle
16350	Kelton, D.	Enhancing milk quality and udder health in Ontario through a sentinel data network.
23130	Peregrine, A.	Epidemiology and impact of neosporosis in dairy cattle
18770	Duffield, T.	Evaluation of Prevention, Treatment and Diagnostic Strategies for Retair Placenta and Metritis and Their Subsequent Impact on Reproductive Performance in Lactating Dairy Cattle

Further details on the above projects can be found at the University website at:
http://oasis.uoguelph.ca/

RECOMMENDATION #5 **PRIORITY 1B**
TO U OF G, OMAFRA, AAFC

ANIMAL WELFARE

To conduct research that leads to improvement in dairy animal welfare or an increase in understanding of dairy cattle behaviors.

BACKGROUND

Animal welfare is one of the expanding socioeconomic issues that the dairy industry must face, but which traditional animal science disciplines are poorly equipped to handle. Initial concern for animal welfare issues in North America was prompted by European animal welfare legislation.

Industry's interest in animal welfare will likely be driven by increasing concern about the image of the industry and a shift in consumer demand towards "green" farm produce. Research has now identified the widespread effects of stress on animal health and productivity. New dairy free-stall barns been constructed included a number of alternatives for free-stall bases and bedding alternatives. There is only limited scientific research data available comparing these alternatives.

DETAILS

1.Ne w practices, such as tail docking may be questioned by the consumer. Research to address the need and effects of this practice and others, on cow health and behaviors are required.

2.T o study the effect of housing and other environmental factors on cow comfort, health and productivity. Specific to Ontario is the need to assess the impact of alternative free-stall and bedding sources.

Response
UNIVERSITY OF GUELPH: These details are being addressed in the following projects:

Project No.	Project Leader	Project Title
23080	Morgan, J.	Assessment of acute and chronic pain after tail docking in calves
23070	McKnight, D.	Heifer nutrition, management and housing
18750	Duncan, I.	The Effects of Tail Docking on the Welfare of Dairy Cows
16410	McKnight, D.	Investigation of installation, cost and durability of four manger surfaces in a tie stall dairy barn

Further details on the above projects can be found at the University website at:
http://oasis.uoguelph.ca/

RECOMMENDATION #6 **PRIORITY 1B**
TO ARIO, CARC, U of G, OMAFRA
DAIRY MANAGEMENT SYSTEMS

To support research to assess the impact of dairy manure handling systems and milking center washwater treatment on dairy management systems and financial viability.

BACKGROUND

The current collection, transfer and storage systems, used in free-stall housing require different management strategies to reduce environmental impact. Flush systems and manure separation are more common. More emphasis on nutrient management is required. Vegetative filter strips are being assessed for use in treating runoff and milking center washwater from smaller dairy farms. Alfred College has started some good work in these areas and should continue. Concern was also raised over the use of industrial by-products as soil amendments and bedding sources.

DETAILS

1.T o investigate the effects of various manure handling systems on animal and work health, costs and impact on the environment.
2.T o evaluate the effectiveness of non-traditional sanitizers such as peroxide on cleaning management and the environment.
3.T o evaluate the effectiveness of constructed wetlands or vegetative filter strips for treating runoff from exercise yards and milking center washwater.
4.T o investigate the impact of nutritional management to reduce manure levels

Response
UNIVERSITY OF GUELPH: There is no research, which is registered, in the Animal Program at the University of Guelph, in this area at the present time. Research is on going in the Environment and Resources Program with respect to detail # 4. Other aspects of this recommendation will be referred to the Dairy Program, through the Dairy Coordinator.

RECOMMENDATION #7 **PRIORITY 1B**
TO U OF G, OMAFRA, AAFC

DECISION SUPPORT SYSTEMS

To identify factors and develop decision support systems that impact profitability on dairy farms in Ontario.

BACKGROUND

The Ontario dairy industry must prepare itself for increased market competition given the inevitable reduction of current import tariffs on dairy products and the subsequent effect on our milk pricing system. Our dairies need to be able to quantify the production and economic efficiencies of their operation to identify their strengths and weaknesses. These must come before they can make the necessary strategic decisions that will ensure the long term viability of their farms. These decisions must be made with a knowledge of the biological and economic consequences of their actions. The type of analysis required to generate this information can only come from an integrated analysis of all aspects of the diary enterprise. The current thrust to promote and utilize the DHI Dairy Comp 305 computer records program is fully supported.

DETAILS

1.T o identify and quantify the financial and biological factors that influence net farm income on Ontario dairy farms and to measure the association between health, reproduction, disease, genetics, production and diary enterprise profitability.

2.Su pport the adoption of DHI Dairy Comp 305 and subsequent analysis of inputed data for Ontario.

Response
UNIVERSITY OF GUELPH: These details are being addressed in the following projects:

Project No.	**Project Leader**	**Project Title**
13570	Lissemore, K.	A decision support system for the Ontario dairy industry.

Further details on the above projects can be found at the University website at:
http://oasis.uoguelph.ca/

RECOMMENDATION #8 **PRIORITY 1B**
TO U OF G, OMAFRA, AAFC

HOUSING SYSTEMS

To support research into the assessment of low cost housing system and their effects on profitability and the environment.

BACKGROUND

The trend to free stall housing continues in Ontario. New building and ventilation techniques attempt to combine least cost housing with optimal cow environment. Several new greenhouse barns have been built for both the housing of heifer calves and the housing of milking cows. An open front free stall barn has also been built. This new technology requires monitoring to assess benefits versus costs.

DETAILS

To study factors that affect the cost and success of various housing systems for calves, replacement heifers, dry cows and milking cows.
1.T o investigate the environment in new greenhouse barns during all seasons of the year.
2.T o support on-farm comparison of housing and ventilation alternatives developed in other regions and countries for their uses in Ontario, especially low-cost alternatives.

Response
UNIVERSITY OF GUELPH: These details are being addressed in the following project:

Project No.	Project Leader	Project Title
23070	McKnight, D.	Heifer nutrition, management and housing.

Further details on the above projects can be found at the University website at:
http://oasis.uoguelph.ca/

SUMMARY OF DISTRIBUTION OF 1998 RECOMMENDATIONS

	Recommendation	AAFC	ARIO	OMAFRA	U OF G	CARC	OTHER
1	Nutritional Strategies	X		X	X		
2	Reproduction Technology	X		X	X		
3	Genetic Evaluation	X		X	X		
4	Infectious Diseases	X		X	X		
5	Animal Welfare		X	X	X	X	
6	Manure Handing		X	X	X	X	
7	Decision Support		X	X	X	X	
8	Housing Systems		X	X	X	X	

SUMMARY OF DISTRIBUTION OF 1999 RECOMMENDATIONS

	Recommendation	**AAFC**	**U of G**	**ARIO**	**OMAFRA**	**OTHER**
1	Nutritional Strategies	X	X			
2	Reproduction Technology	X	X			
3	Genetic Evaluation	X	X			
4	Infectious Diseases	X	X			
5	Animal Welfare	X	X	X		Ont. Hydro
6	Decision Support		X		X	ODHI
7	Housing Systems	X	X		X	

1999 RESEARCH & SERVICES RECOMMENDATIONS

RECOMMENDATION #1 **PRIORITY 1B**
To U of G, AAFC

NUTRITION

To define cow nutrient requirements during stressful periods such as transition, early lactation and peak production. To research nutritional and feeding strategies that reduce feed costs and directly impact the production of milk components of high economic value, without compromising health, reproduction or milk quality.

1. Research is needed to redefine the nutrient requirements of the modern cow, during critical life stages such as transition and early lactation, while determining allowances for health and reproductive performance.

2. Research is required into "on farm" feeding systems comparing the impacts of single and multiple group TMR's and silage processing and the effects of by-product fibers on required fibre in rations to maintain animal health and desired milk component levels. Assessing the impacts of mineral levels formulated relative to NRC nutrients is an Ontario issue.

3. Initiate a research program to evaluate the nutritional quality of corn silage as influenced by variety, management and climatic conditions in Ontario.

4. Initiate a research program to elucidate nutritional factors that impact lameness in dairy cattle

5. Investigate the impact of nutritional management to reduce manure nutrient levels.

BACKGROUND

The interrelationship of production, health and reproduction in dairy cows is now better understood and yet little research is devoted to data collection and analysis of these variables simultaneously. Many nutrient requirements used in ration formulation today are based on production levels, management systems and research investigations of 20 or more years ago and may not reflect the nutrient needs of the cow today or in the future. There are also concerns related to the use of single group TMR's, silage processing effects on fibre levels and mineral levels fed relative to NRC requirements.

RECOMMENDATION #2 **PRIORITY 1B**
TO AAFC, U of G

REPRODUCTION

To support research to increase the reproductive efficiency of dairy animals and that will elucidate factors affecting reproduction in the high producing cow. To conduct a cost benefit analysis of the application, economic potential, conduct and acceptance of research in dairy molecular genetics.

DETAILS

1. To refine the techniques for programmed breeding, especially with high producing cows.

2. To study oestrus detection, insemination times and techniques, especially as they relate to effects of nutritional ie minerals and other stresses on ovarian function, reproduction and culling.

3. With additional funding, studies to collect oocytes, improve the success of in vitro fertilization and refine semen sexing, embyro splitting, cryopreservation and cloning techniques should be encourage, in co-operation with federal researchers working in the same area of emphasis.

4. Research in molecular genetics is long term and expensive. It can provide a link to quantitative genetics and identify opportunities for producers to fill a niche market in the production of milk that has been genetically altered. It may be necessary to create a development position to examine this, as it is unclear as to whose mandate it is to conduct a cost benefit analysis of molecular genetics.

BACKGROUND

Extended calving intervals and reduced longevity due to culling for reproductive failure are problems on Ontario dairy farms. The trend toward higher production levels puts additional pressure on the dairy producer to get cows pregnant. Research in other species has used molecular genetics to alter carcass quality and to reduce phosphorus excretion. Similar opportunities exist in dairy cattle research in molecular genetics. Since this research is long term and expensive, investigation of the opportunities for Ontario's dairy community to benefit from studying molecular genetics is necessary. Preliminary technology now exists to also consider cloning as a means of rapidly increasing the frequency of more desirable genotypes in the cow population.

RECOMMENDATION #3 **PRIORITY 1C**

GENETICS

To continue refining Canada's dairy sire and cow genetic evaluation systems.

DETAILS

1. To test and validate variations to the current systems utilizing such approaches as the test day model to improve the repeatability of breeding value indices.

2. To determine the suitability of new technologies, such as gene markers in the refinement of dairy sire and cow evaluation systems.

BACKGROUND

Dairy producers are using Canadian, US and internationally proven bulls in their breeding programs; however, even within the Canadian system for sire and cow genetic evaluation system there are some concerns as to whether or not particular situations are adequately accounted for in the calculations. In particular, those related to herd housing method and preferential handling of bull dams needs to be addressed. Changes to the systems to improve the repeatability of breeding values would be of significant value to the industry.

New technologies, such as gene markers, are emerging, which to date, have not been utilized in the current genetic evaluation system for sires and dams. The utilization of such information needs to be evaluated in terms of improving the repeatability and acceptance of genetic indices.

RECOMMENDATION #4 **PRIORITY 1C**
TO AAFC, U of G

HEALTH

To encourage research that identifies the incidence, prevalence and impact of infectious diseases such as mastitis, abortion associated with Neospora and Papllomatous Digital Dermatitis, that will lead to the development of effective bio-security programs for Ontario dairy herds.

DETAILS

1.Rese arch into the identification and implementation of methods which effectively and economically prevent infectious disease remain a priority. Specifically research on mastitis, abortions and newly identified diseases is encouraged.

2.I nvestigate the impact, cure and prevention of diseases, such as strawberry food, on lameness in dairy cattle.

BACKGROUND

Diseases caused by bacteria and viruses impact on productivity of Ontario dairy farms. Mastitis, measured by bulk tank and DHI SCCs, remains prevalent. Lowering SCCs remains a DFO priority. Adoption of recognized measures for control of contagious mastitis remains an issue for many farms. The identification and implementation of methods which effectively and economically prevent environmental mastitis remains a research priority.

Abortions associated with Neospora and lameness caused by Papillomatous Digital Dermatitis (Strawberry Foot) are increasingly reported in veterinary herd surveys and laboratory surveillance data. The extent and economic impact have yet to be documented. There is need for on-farm research into the patterns and the impact these diseases have in Ontario's dairy herd. Ongoing access to representative herds, for studies such as those being conducted on mastitis through the "Sentinel" project, is essential.

Ultimately, there is increasing evidence that producers and veterinarians need information on disease patterns and effective management strategies to protect dairy herds from infectious diseases and the use of this information to develop herd bio-security programs is a critical step.

RECOMMENDATION #5 **PRIORITY 1B**
TO: ARIO, U of G, AAFC, Ontario Hydro

ANIMAL WELFARE

To conduct research that leads to improvement in dairy animal welfare or an increase in understanding of dairy cattle behavior.

DETAILS

1. New practices, such as tail docking may be questioned by the consumer. Research to address the need and effects of this practice and others, on cow health and behavior are required.

2. To study the effect of housing and other environmental factors on cow comfort, health and productivity. Specific to Ontario is the need to assess the impact of alternative free-stall and bedding sources.

3. To identify and study the impacts and solutions to transient tingle voltage on dairy cattle.

BACKGROUND

Animal welfare is one of the expanding socioeconomic issues that the dairy industry must face, but which traditional animal science disciplines are poorly equipped to handle. Initial concern for animal welfare issues in North America was prompted by European animal welfare legislation. Industry's interest in animal welfare will likely be driven by increasing concern about the image of the industry and a shift in consumer demand towards "green" farm produce. Research has now identified the widespread effects of stress on animal health and productivity. New dairy free-stall barns being constructed include a number of alternatives for free-stall bases and bedding alternatives. There is only limited scientific research data available comparing these alternatives. OFA and DFO have supported the need for additional research on transient tingle voltage.

RECOMMENDATION #6 **PRIORITY 1B**
TO: U. of G., OMAFRA, ODHI

ECONOMICS

To identify factors and develop decision support systems that impact profitability on dairy farms in Ontario.

DETAILS

To identify and quantify the financial and biological factors that influence net farm income on Ontario dairy farms and to measure the association between health, reproduction, disease, genetics, production and dairy enterprise profitability.

1. Support the adoption of DHI Dairy Comp 305 and subsequent analysis of inputted data for Ontario.

BACKGROUND

Our dairies need to be able to quantify the production and economic efficiencies of their operations to identify their strengths and weaknesses. These must come before they can make the necessary strategic decisions that will ensure the long term viability of their farms. These decisions must be made with a knowledge of the biological and environmental sustain ability and economic consequences of their actions. The type of analysis required to generate this information can only come from an integrated analysis of all aspects of the dairy enterprise. The current thrust to promote and utilize the DHI Dairy Comp 305 computer records program is fully supported.

RECOMMENDATION #7 **PRIORITY 1B**
TO: U of G, OMAFRA, AAFC

COST ASSESSMENTS

To support research into the assessment of low cost and alternative housing and milking systems and their effects on profitability and the environment.

DETAILS

1. To study factors that affect the cost and success of various housing systems for calves, replacement heifers, dry cows and milking cows.

2. To investigate the environment in new greenhouse barns during all seasons of the year.

3. To support on-farm comparison of housing and ventilation alternatives developed in other regions and countries for their uses in Ontario, especially low-cost alternatives.

5. To evaluate the effectiveness of constructed wetlands or vegetative filter strips for treating manure, runoff from exercise yards and milking center washwater.

6. To evaluate the effectiveness of non-traditional sanitizers, such as peroxide, on milkhouse cleaning, management and the environment.

BACKGROUND

The trend to free stall housing continues in Ontario. New building and ventilation techniques attempt to combine least cost housing with optimal cow environment. Several new greenhouse barns have been built for both the housing of heifer calves and the housing of milking cows. An open front free stall barn has also been built. This new technology requires monitoring to assess benefits versus costs.

ODRSC MEMBERSHIP LIST 1999/2000

Name	Organization	Address	Telephone	Fax No.
Dr. John DEVENISH	Canadian Food Inspection Agency	3851 Fallowfield Rd. Box 11300 Stn.H, Nepean ON K2H 8P9	613-228-6698 ext. 4857	613-228-6670
Mr. Leo BRISSON	Dairy Farmers of Ontario	47 St.Jean Baptiste, C.P 1205 Embum, ON K0A 1W0	613-443-2372	613-443-3640
Dr. Helene PETIT	Lennoxville Dairy & Swine Research & Development Ctr.	C.P. 90, 2000 Route Est. Lennoxville, P.Q. J1M 1Z3	819-565-9174 ext.210	819-564-5507
Dr. Ann GODKIN	Ont. Ministry of Agriculture, Food and Rural Affairs	Wellington Place, RR #1 Fergus, ON N1M 2W3		
Dr. Tim HENSHAW	Gencor (Artificial Insem. Industry)	Box 110 Minesing, ON L0L 1Y0	705-737-5919	705-737-4295
Mr. Harold HOUSE	Ont. Ministry of Agriculture, Food and Rural Affairs	159.10 Don Street Clinton, ON N0M 1L0	519-482-3428	519-482-5031
Dr. Kerry LISSEMORE	Ont. Veterinary College	University of Guelph Guelph, ON N1G 2W1	519-824-4120 ext.4036	519-763-8621
Mr. Dennis McKNIGHT (*)	ODRSC Chairman	Kemptville College, U of G Box 2003, Kemptville ON K0G 1J0	613-258-8336 ext. 348	613-258-8401
Mr. Paul NORRIS	Ont. Ministry of Agriculture,Food and Rural Affairs	RR #1, Wellington Place Fergus, ON N1M 2W3	519-846-0941	519-846-8178
Dr. Clare RENNIE	Semex Alliance	130 Stone Road Guelph, ON N1G 3Z3	519-821-5060	519-821-7225
Dr. Alan VAAGE	Ontario Grain/Feed Association	1020 Hargrieve Road London, ON N6E 1P5	519-685-4300	519-685-9410
TBA	Ont. Dairy Herd Improvement Corporation			
Mr. Hans VINK	Dairy Farmers of Ontario	R.R. #2 Norwood, ON K0L 2V0	705-696-2169	705-696-1427
Dr. John WALTON	Dept. of Animal & PoultryScience	University of Guelph Guelph, ON N1G 2W1	519-824-4120 ext.3706	519-767-0573
Mr. Bob KERR	Ont. Large Herd Operators	c\o R.R. #2 Acton, ON L7J 2L8	519-853-0138	519-853-1428

Establishment: AGRICULTURE AND AGRI-FOOD CANADA, RESEARCH BRANCH, DAIRY AND SWINE RESEARCH AND DEVELOPMENT CENTRE
P.O. Box 90, 2000 Route 108 East
Lennoxville, Quebec, J1M 1Z3

Title: *Prévention des pertes de production et de qualité du lait par la modulation desmécanismes naturels de défense contre la mammite,* The prevention of losses in milk production and quality by altering the animal's natural defense mechanisms against mastitis.
Study Leader: LACASSE P
Start Date: 01/04/1997 **Expected End Date:** 29/03/2002
Study Number: 326-1321-9701

Title: *Croissance et développement de la glande mammaire chez les bovins laitiers.* The growth and development of mammary glands in dairy cattle.
Leader: PETITCLERC D
Start Date: 01/04/1997 **Expected End Date:** 31/03/2000
Study Number: 326-1321-9003

Title: Behavioural measures of cow comfort to improve stall design
Study Leader: DE PASSILLE A M
Start Date: 04/01/1997 **Expected End Date:** 04/01/2003
Study Number: 326-1321-9802

Title: *Ecosystème microbien ruminal responsable du haut potentiel de digestion des fibres alimentaires chez le ruminant.* The ruminal microbial ecosystem responsible for the superior ability to break down dietary fiber exhibited by ruminants.
Study Leader: CHIQUETTE J
Start Date: 04/01/1998 **Expected End Date:** 31/03/2005
Study Number: 326-1321-9803

Title: *Effet de la suppémentation protéique et\ou énergétique et de l'utilisation des fourrages sur la production, la reproduction et l'immunité de la vache laitière.* The effect of protein and/or energy supplementation and of the use of forage on the production, reproduction and immune repsonse of dairy cattle.
Study Leader: PETIT H
Start Date: 04/01/1998 **Expected End Date:** 31/03/2004
Study Number: 326-1321-9805

Title: *Développement de méthodes de production d'embryons chez l'espèce ovine.* The development of embryo production methods in sheep.
Study Leader: CASTONGUAY F
Start Date: 04/01/1998 **Expected End Date:** 29/03/2002
Study Number: 326-1351-9801

Title: Development of analytical procedures to evaluate the genetic merit of Canadian livestock
Study Leader: LIN C Y
Start Date: 04/01/1992 **Expected End Date:** *30/06/1998*
Study Number: 326-1321-9806

Title: *Le destin métabolique de l'azote chez le bovin: de l'aliment à la protéine consommée par l'humain.* The metabolic fate of nitrogen in cattle: from feed to human protein intake.
Study Leader: LAPIERRE H
Start Date: 07/01/1998 **Expected End Date:** 07/01/2003
Study Number: 326-1321-9809

Title: *Identification des régulateurs métaboliques et endocriniens responsables d'une forte productivité et détermination de stratégies alimentaires pour améliorer l'efficacité bioénergétique chez le bovin.* The identification of metabolic and hormonal regulators responsible for high productivity and the determination of feeding strategies to enhance bioenergetic efficiency in cattle.
Study Leader: LAPIERRE H
Start Date: 01/04/1988 **Expected End Date:** *31/12/1996*
Study Number: 326-1321-9004

Title: *Développement de méthodes fiables et économiquement viables de contrôle du cycle.oestral et de production d'embryons chez le bovin.* The development of reliable and economically viable means of controlling the estrous and embryo production cycles in cattle.
Leader: GUILBAULT L
Start Date: 01/04/1994 **Expected End Date:** 01/03/1999
Study Number: 326-1321-9401

Title: *Amélioration de la fromageabilité du lait et de la valeur nutritive du gras laitier par la manipulation des facteurs associés à la synthèse des composantes du lait.* Improving the cheese yield of milk and the food value of milk fat by altering the factors associated with the synthesis of milk ingredients.
Study Leader: LACASSE P
Start Date: 01/04/1996 **Expected End Date:** 31/10/2001
Study Number: 326-1321-9601

Title: Handling dairy cattle to reduce their fear and improve their welfare, safety and productivity
Study Leader: RUSHEN J
Start Date: 01/04/1996 **Expected End Date:** 01/04/2001
Study Number: 326-1321-9605

Title: *Développer des stratégies alimentaires et métaboliques pour améliorer les processus de digestion et d'absorption en vue de maitriser la synthèse du lait chez les ruminants.* Developing feeding and metabolic strategies to improve the digestive and uptake processes in order to control milk synthesis in ruminants.
Leader: OUELLET D
Start Date: 01/04/1996 **Expected End Date:** 31/03/2003
Study Number: 326-1321-9606

Title: Étude des besoins en acide folique des ruminants. A study of folic acid requirements in ruminants.
Study Leader: GIRARD C
Start Date: 01/01/1996 **Expected End Date:** 01/01/2000
Study Number: 326-1321-9607

Establishment: **AGRICULTURE AND AGRI-FOOD CANADA, RESEARCH BRANCH, LETHBRIDGE RESEARCH CENTRE**
Highway 3 East, P.O. Box 3000, Main
Lethbridge, Alberta, T1J 4B1

Title: Development of super enzymes, feed additives, transgenic microorganisms and, transgenic plants for increasing feed utilization and reducing pollution from livestock.
Study Leader: MCALLISTER T A
Start Date: 04/01/1997 **Expected End Date:** 09/12/2005
Study Number: 387-1311-9710

Title: Nutritional strategies to enhance cattle productivity, health, and product quality.
Study Leader: BEAUCHEMIN K A
Start Date: 04/01/1997 **Expected End Date:** 20/05/2002
Study Number: 387-1311-9712

ONTARIO DEER RESEARCH AND SERVICES COMMITTEE

EXECUTIVE SUMMARY

The committee discussed the value of investing time in this committee - due to the limited opportunity for provincial funding for deer and elk research. The effort received full support because of its potential for positive impact in many different ways. This year, progress has been made in many of the important issues affecting the industry - due in large part to cooperation and joint funding from OMAFRA, ODEFA and the CFIA. Private researchers, working with producers, have been successful in attracting matching funds from federal agencies. Health of the provincial herds continues to be the highest priority with concerns over quality assurance programs emerging, as in all animal industries.

COMMITTEE ACTIVITIES

The chairmanship of the Committee changed this year, for the first time. The Committee recognized Dr. Bob Wright for his many years of service. The Committee met in September. Representation included government agencies (OMAFRA - 2; C.F.I.A. - 1), industry (ODEFA - 3), University of Guelph (1) and wildlife agencies (1). All aspects of the deer industry were represented: elk and deer species ; velvet, venison and deer urine production. One industry representative is active in applied research. Katherine Hoffman, OMAFRA Research Analyst, joined the meeting to present information on OMAFRA's Special Research Fund and on the process of prioritising and recommending research proposals.

Members discussed the value of investing their time in this committee when OMAFRA does not recognize the deer/elk species in their research contract with the University of Guelph - thus not providing access to funding and other resources. The committee concluded that there was value to bringing the industry together with University and government representatives to discuss and prioritise research, service needs and other issues - to be used within in the OMAFRA/ARIO system and by other ministries and funding agencies. The committee expressed appreciation that OMAFRA gave opportunity for "alternative livestock" to compete for funds in the 1998 Special Research Fund and is hopeful that the Fund with be repeated annually.

It was stressed to the industry representatives that more credibility would accompany the recommendations if the industry (ODEFA) could identify funds and other in-kind resources to match ministry support.

The committee requests that its name be changed to the Deer and Elk Sub Committee.

The structure of the Ontario Deer and Elk Farmers Association has changed. ODEFA is now the umbrella organization representing species groups: The Fallow Deer Society of Ontario; The Canadian Red Deer Assoc. (Ontario Chapter); the Ontario Elk Breeders Assoc.; and the White-tail Deer Producers Assoc. This change may impact on representation to this committee in the future.

STATE OF THE ONTARIO DEER INDUSTRY

It has always been difficult to estimate the total number of deer and elk farmed in Ontario, because there is no provincial licensing mechanism in place to track animal inventories. During 1999, OMAFRA hired a summer student, with the financial assistance of the Ontario Deer Elk Farmers Association (ODEFA), to work with the Canadian Food Inspection Agency (CFIA) to develop a confidential spreadsheet for all known owners of captive deer and elk in Ontario. This project allowed CFIA to estimate the number of operations keeping elk and various deer species, as well as the respective inventories of animals. Table 1 summarizes the results showing there were about 354 operations keeping a total of 19,342 animals or an average of 55 animals/operation. It should be stressed these figures represent all deer and elk operations (zoos, private and public animal collections, pets...), not just deer and elk farms. About 60% of the herds kept more than 10 animals, which accounts for about 97% of the total deer and elk.

Table 1 – Animal Inventory and Number of Operations Keeping Deer and Elk in Ontario – CFIA, 1999

	Species						
	Elk	**Elk/Red Deer Hybrids**	**Red Deer**	**Fallow Deer**	**White Tail Deer**	**Other Deer**	**Total Deer & Elk**
# of Operations	66	35	97	159	31	7	354
% of Total Operations	19%	10%	27%	45%	9%	2%	100%
# of Animals	2,578	2,013	6,851	6,704	694	502	19,342
% of Total Animals	13%	10%	35%	35%	4%	3%	100%
Average # Animals/Operation	39	58	71	42	22	72	55

Table 2 summarizes the estimated 1999 provincial and national deer and elk inventories and approximate values as provided by the Canadian Venison Council.

Table 2. – Canadian Venison Council's Estimated Inventories of Deer & Elk in Canada as of Oct 1, 1999

Province	**Elk**	**Elk/ Red Crosses**	**Red Deer**	**White Tail Deer**	**Fallow Deer**	**Reindeer**	**Other Deer**	**Total Animals**	**# of Farms**
Yukon & NWT	150					9,500		9,650	8
B.C.					12,000	400		12,400	60
Alberta	25,000			6,000		225	300	31,525	490
Saskatchewan	21,000			3,000	3,000	50	200	27,250	500
Manitoba	2,000			50	650		30	2,730	95
Ontario	3,300	2,600	7,000	900	6,800		500	21,100	350
Quebec	2,000	1,500	6,500	7,500	3,000		400	20,900	350
New Brunswick	50	60	500	45	12			667	14
Nova Scotia & PEI	35	15	250					300	12
Canada	53,535	4,175	14,250	17,495	25,462	10,175	1,430	126,522	1,879
Livestock Value ($ million)	$374.7	$6.3	$14.3	$52.5	$7.6	$10.2$0.	7	$466.3	
Livestock Value ($/animal)	$7,000	$1,500	$1,000	$3,000	$300	$1,000	$490		

The number of provincially inspected plants processing deer and/or elk dropped 25%, from 20 in 1998 to 15 in 1999. The deer and elk industry are concerned this 25% drop is a direct result of the harmonization of Federal/Provincial meat inspection standards. There is fear that even more provincial plants will close or choose not to process deer, as a result of the increased investment that will be required to meet federal standards.

Table 3 shows the number of deer and elk processed in either provincially (15) or federally (2) inspected plants. Note the federally inspected plants do not differentiate between species of deer. Also note that the 1998 figures for deer & elk processed in federal plants were not supplied by CFIA. The number of deer and elk processed in provincial plants was up 8% in 1998 (574) from 1997 (531). If the 8% increase is extrapolated to the federal plants, the total number of deer and elk processed in 1998 was around 2,300, compared to an average of 1,600 deer/year processed during the three-year period from 1992 to 1994. During the subsequent 3 year period from 1995-1997, an average of 2,120 deer or elk were processed, a 33% increase. The number of fallow deer being processed in provincially inspected plants has decreased by 48% since 1994. The majority of the increased deer being processed are red deer, which probably also includes some red deer/elk hybrids, since there is currently no hybrid category. It is also interesting to note that the number of elk processed for meat in provincial plants has increased by 137% from 1997 to 1998, an significant increase which is attributed primarily to lower velvet prices. It should also be acknowledged that a good share of these "elk" may also be red deer/elk hybrids or F1's.

Table 3 - Number of Deer and Elk Processed in Provincially or Federally Inspected Ontario Plants

	Year								
Species	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
Fallow Deer – Provincial	55	216	143	429	766	520	503	386	399
Red Deer – Provincial	0	123	58	107	151	147	111	134	149
Elk – Provincial	28	42	5	10	23	23	8	11	26
All Deer & Elk – Federal	61	463	1,366	1,197	528	1,922	996	1,598	1,726*
Total Deer & Elk	144	844	1,572	1,743	1,468	2,612	1,618	2,129	2,300*

* CFIA did not supply slaughter numbers for 1998, thus Federal numbers were estimated using the 8% increase processed by provincial plants

There is currently only a fair Ontario market for farmed venison, primarily from the hotel and restaurant sectors. Farmers estimate that 90-95% of the Ontario produced venison is sold to Quebec or the United States. Most Ontario producers sell their venison to wholesalers/distributors at prices of $2.50 to $2.75/lb. warm carcass weight, depending on the species. There is generally a premium paid for red deer over fallow deer, because of the difference in carcass size and subsequent efficiencies in processing. Producers that are committed to marketing some or all of their own product(s) to local restaurants, delis or butchers or directly to the consumer by farm gates sales, are achieving higher prices ($4 to $6/lb.), however keep in mind the additional time and expense in developing these niche markets.

For those marketing venison through wholesalers, prices have been slightly lower than in previous years ($3.00 - $3.50/lb.), due primarily to an increased supply of venison from both Ontario and New Zealand. New Zealand was forced to slaughter significantly larger numbers of red deer and red deer/elk hybrids due to feed shortages resulting from drought. However the economic crisis of Asia and specifically Korea, played a far more important role in the industry's decision to dramatically reduce the breeding inventory. The demand for Ontario velvet was very strong until 1997, with good quality, large "sticks" bringing $95 - 100/lb. for elk velvet and $75 - $85/lb. for red deer and hybrid velvet. However velvet prices have dropped dramatically during the last two years, with velvet currently selling for an average of $30-$50/lb. Many producers have much of their 1999-velvet crop stored in freezers. Cash flow difficulties, resulting from weak velvet markets and lower venison prices, may dictate whether Ontario red deer, elk and hybrid producers reduce their breeding inventory. If there is a substantial decrease, the increased supply of venison may drive venison prices even lower.. The Canadian Venison Council estimates the 1999 harvest of velvet antler from elk and red deer at 430 tonnes for New Zealand, 60 tonnes for Russia, 60 tonnes for China, 52 tonnes for Canada and 40 tonnes for USA.

Breeding stock prices have weakened even further, as the velvet markets have become less stable. Table 3 summarizes prices for elk, red deer, hybrids, fallow deer and white-tailed deer as provided by members of the ODEFA. Over the last 2 years average prices have dropped 30-50% for elk and 20–50% for red deer, and are primarily related to the velvet market. The fallow deer prices remain largely unchanged as they are marketed primarily for venison thus the down turn in the velvet market has not directly affected this segment of the deer farming industry.

The white-tailed deer prices have remained strong, since the breeding stock pool is fairly limited. The white-tailed deer are being raised primarily to provide "trophy" bucks, which are being sold to hunting enclosures in Quebec and the United States. The Ministry of Natural Resource's "Fish and Wildlife Conservation Act" does not permit the hunting of farmed white-tailed deer or elk in Ontario, but does allow for the hunting of non-native farmed species such as fallow and red deer. This means Ontario producers must sell trophy white tailed deer bucks and elk bulls to markets outside of Ontario, thus the related value-added and rural economic development benefits such as tourism, are gained by entrepreneurs in other jurisdictions. The Ontario White Tailed Deer Producers Association (OWTDPA) reports that U.S. hunting preserves buy trophy bucks at 2 years of age. The OWTDPA states a 4-day hunt would generate $2,500 plus the trophy fee. For successful hunts, trophy fees would range from $2,000 for a small mature antlered deer, to $3,000 for a 150" B&C* buck, to $5,000 for a 170" B&C trophy buck. ODEFA is lobbying for changes to the proposed legislation and regulations to allow for hunting enclosures for white-tailed deer and elk in Ontario.

Table 3 - 1998 Deer and Elk Prices as Reported by members of Ontario Deer and Elk Farmers Association

Species	Mature Males	Bred Mature Females	Yearlings	Calves/Fawns
Elk	$8,500/bull	$6,000 - 8,000/cow	$5,500/female $1,500/male	$3,500/female $1,000/male
Elk/Red Hybrids	$600 - 800/stag (meat value)	$1,000 - $1,200/hind	$800/female $500/male	$400/female $300/male
Red Deer	$500 - 600/stag (meat value)	$750/hind	$500/female $300/male	$400/female $200/male
White Tailed Deer (superior genetics)	$7,000/average buck $10 - $15,000/ 180" B&C Score* buck	$5,000 - $6,500/doe	$5,000 - $6,000/female $3,000/male	$3,000 - $4,500/female $1,500 - $2,500/male
Fallow Deer	$300 - $400/buck	$250 - $350/doe	$200/buck $150/doe	$100

* - B&C Score = Boone & Crocket Score measures the size of the deer's antler

CFIA reports on the monitoring program for Chronic Wasting Disease - a spongiform encephalopathy with similarities to BSE in cattle and scrapie in sheep. CFIA reports that numbers are likely on the low side (probably under reported), as the surveillance network for CWD is just at it=s inception and new initiatives should increase submissions and reporting.

Table 4. Provincial and Federal Submissions and Diagnosis of CWD

YEAR	ONTARIO	QUEBEC	SASKATCHAWAN.	MANITOBA /ALBERTA	CANADA
1996	3	1	43 (1 pos)	- / -	46 (1 pos)
1997	5	8	44	1 / -	58
1998	1	-	24 (1 pos)	- / 268	294 (1pos)
1999	31	-	3	- / -	34
Totals	68	9	114(2 pos)	1 / 268	**460**

RESPONSE TO 1998 RECOMMENDATIONS

RECOMMENDATION # 1

DISEASE SURVEILLANCE

OBJECTIVES

1. To encourage research that identifies the in apparent carrier states, and reservoirs of infection, of Johne's, Chronic Wasting Disease, Tuberculosis and the parasites *E. cervi* and *P. tenuis.*

2. To encourage research which improves the reliability and specificity of laboratory tests, which have been developed in other livestock species, for the diseases and parasites named above.

3. To encourage research which identifies the risks and impact of a disease on the industry and provides strategies for managing or minimizing the risk and the economic impact.

ACTION TAKEN

- Funding was obtained from the OMAFRA Special Research fund and from to support continued research into improvements in testing for the parasite, P. tenus.

- CFIA has a program in place to monitor for cases of Chronic Wasting Disease and is developing improvements in the testing for Tuberculosis.

- OMAFRA and ODEFA co funded a summer student to evaluate herds on restrictive status". It was learned that 11 (or 5%) of herds (down from the 135 herds thought previously -and 9 of the 11 have less than 15 head) have unknown TB status and are restricted in the sale of animals and product.

- ODEFA funded CFIA research into improvements in testing for cervid tuberculosis.

RECOMMENDATION # 2

MARKETING AND QUALITY ASSURANCE

The industry has identified the key barriers to marketing A Quality Canadian Venison and Deer Industry Products as detailed below.

OBJECTIVES

PRIORITY 1A

1. The inability to identify animals from hoof to fork is a major barrier to the industry and, when overcome, forms the basis of a quality assurance program..

PRIORITY 2B

2. The criteria used to define quality in various products are not specified for the deer species currently farmed.

PRIORITY 2B

3. Product diversification. Development of products and product recognition are required to create specialty niche markets and add value to existing products.

ACTION TAKEN

While no research has been conducted, the industry , through the Canadian Venison Council, is addressing issues of quality assurance and quality standards, including management practices, facilities and product quality.

RECOMMENDATION # 3

REPRODUCTION

OBJECTIVES

PRIORITY 2B

1. Develop practical and humane methods for non-invasive artificial insemination and embryo transfer.

PRIORITY 2B

2. Develop effective programs for synchronization of estrus - including advancement of the breeding season.

PRIORITY 2B

3. Research the capabilities of in vitro embryo production particularly in fallow and white tailed deer using live animal donors and oocytes recovered from eggs at slaughter.

ACTION TAKEN

- A private research project was conducted on-farm using new approaches for trans cervical AI in White-tailed deer. Funding has been sought from the National Research Council (IRAP Grant) for extended research on AI and embryo transfer in the White-tail species.

- A small pilot trial was conducted at the University of Guelph to explore the potential of in vitro embryo production from fallow deer following protocols used in sheep.

- A private research project has been funded by the National Research Council (IRAP) into the use of reproductive technologies to enhance elk production.

1998 NON-RESEARCH RECOMMENDATION

TUBERCULOSIS TESTING OF UNTESTED HERDS

The C.F.I.A. has the authority for testing livestock for tuberculosis. However, there are 135 known deer herds which are untested. It is paramount to all committee members that these herds are tested. A project will be initiated to use C.F.I.A. veterinarians and authority, coupled with ODEFA expertise, and a mobile handling facility to test all untested herds by the year 2000. Committee members will pool financial resources to purchase the necessary equipment and hire a technician to work with C.F.I.A. veterinarians.

ACTION TAKEN

OMAFRA and ODEFA jointly funded a summer student to evaluate the untested herds. It was learned that it is now a non-issue, with only 11 or 5% of herds remaining untested. Sale of product and livestock are restricted from these untested herds.

EMERGING and IMPORTANT ISSUES

1. Movement of genetics between provinces continues to be restricted. Improvements in diagnostic testing and disease monitoring are critical. Practical improvements in applied reproductive technologies (semen and embryos) would facilitate movement, as disease becomes a non-issue.

2. The high prevalence of tuberculosis in the northern US states presents a potential threat to the Canadian industry. Herd monitoring is critical.

3. Concern over Chronic Wasting Disease is growing. CFIA monitoring programs are have just begun and need to be encouraged and supported.

4. Farmed White-tailed deer have been excluded from commercial hunting (Bill 139). This is a considerable economic loss to the industry and to the residents of Northern Ontario, in particular.

SUMMARY OF DISTRIBUTION OF 1998 RECOMMENDATIONS

Recommendation	CFIA	ARIO	U of G	CARC	OMAFRA	OFAH	OMNR	ODEFA
Research								
Disease Surveillance	X	X	X	X	X	X	X	X
Marketing		X	X		X			X
Reproduction		X	X					X
Non-Research and Development								
Tuberculosis	X				X	X	X	X

1999 RESEARCH & SERVICES RECOMMENDATIONS

RECOMMENDATION # 1

DISEASE SURVEILLANCE

OBJECTIVES

PRIORITY 1B

1. To encourage research to improve the accuracy and effiency of diagnostic testing for diseases important to the deer and elk industries ; primarily tuberculosis and the parasites *E. cervi* and *P. tenuis.*

PRIORITY 2B

2. To encourage research which monitors and identifies the risks and impact of diseases of importance on the deer and elk industries (Chronic Wasting Disease, Tuberculosis, *E. cervi* and *P. tenuis)* and provides strategies to minimize their economic impact.

BACKGROUND

The prevalence of Johne's, CWD and parasites such as *E. cervi* and *P. tenuis* are unknown in all deer herds in the province. The unknown health status of herds has significant economic impact from lost trade to western provinces (in the case of *E. cervi* an d *P. tenuis)* and from the restrictions to movement of animals due to the uncertainty of the tuberculosis status of untested herds. The uncertainty around Chronic Wasting Disease could impact on venison sales and on the sale of live animals, semen and embryos into the US market.

Test presently available lack the accuracy required.

RECOMMENDATION #2 — PRIORITY 1A

HUMANE ANALGESIA AND RESTRAINT

OBJECTIVE

To encourage research into practical and humane forms of restraint and analgesia for deer and elk.

BACKGROUND

Velvet production is critical to the economic viability of elk and deer production. Velveting is performed under anesthesia. Two forms of anesthesia are considered - chemical (drug induced) and electro-analgesia (locally applied electric current). Chemical anesthesia incorporates the drug into the animal's tissues and, particularly now , with quality assurance programs, could restrict sale of products. Electro-analgesia has been tested and is used in other countries. The Canadian Veterinary Medical Association released a statement that questioned the use of electric forms of anesthesia and restraint. In the opinion of ODEFA, this recommendation was

made without consideration for research done in other cervid producing countries and without adequate supporting documentation. Research is recommended to evaluate the use of electric current as an effective and humane form of restraint and analgesia for these species.

RECOMMENDATION # 3 **PRIORITY 1A**

QUALITY ASSURANCE and MEAT PRODUCTION

OBJECTIVE

To encourage research that will develop quality assurance protocol and standards for quality carcass meat production in farmed cervid species. More specifically, this research should provide knowledge that relates to quality meat production as it relates to:

a) animal procurement (i.e. age, fat cover, sex, time of year; abattoir type; transport and handling; ante mortem nutrition; transport design, processing design; abattoir holding pen design; and misting equipment),

b) carcass processing (stunning; and slaughter technology), and cervid meat production control (i.e. carcass classification and cutout system; carcass quality assurance; venison food safety and shelf life; venison packaging).

BACKGROUND

The inability to track animal from "hoof to fork" is a challenge for all livestock species, including deer. Achieving a practical tracking system will enhance the ability to relate consumer preferences to farm based factors which affect quality. Achieving this level of mandatory inventory will also have a positive benefit to wildlife agencies in their desire to prevent poached game from entering the retail trade. Currently, the cervid industry is observing the cattle industry in the development of the necessary infrastructure which can then be applied to cervids.

Research has been started into the "Qualitative and Quantitative" factors affecting elk meat but little research is available for Canadian raised red deer, fallow deer, red deer x elk hybrids, and white-tailed deer. There are stressors and pre slaughter or shipment treatments which may have negative and positive, respectively, impacts on carcass quality as well as have a strong bearing on the issue of animal welfare and stress minimization. Research proposals should include benchmark criteria as well as the affects of various pre shipment, shipment, and post shipment management protocol.

The primal cuts of quality carcasses are easily marketed. However, work is required which defines the term "quality" as it relates to the carcasses of the various species of cervids. In combination with assessment of quality in the carcass of various deer species, research is needed to define limits and composition which will allow producers and processors to direct animals either toward the primal; or value-added marketplace. Meat composition analysis will also allow each cervid species to define similarities as well as uniqueness in comparison to each other. It is critical for the cervid industry to diversify the product base. The meat market is a

specialty market that has good financial returns and provides a vehicle for culling and herd improvement. However, overall long-term success is closely tied to quality assurance which must be defined by research now as the industry grows. These research avenues in synthesis with the data from cervid meat quality research will permit the development of the quality assurance protocol and program in Ontario which will insure logical and sound development of the cervid meat industry

RECOMMENDATION # 4 **PRIORITY 1B**

REPRODUCTION

OBJECTIVE

To develop practical improvements in reproductive technologies applied to deer and elk production: estrous synchronization, artificial insemination, embryo transfer and in vitro embryo production.

BACKGROUND

Genetic improvement programs, management of herds with known health status and marketing of genetic material require practical methods to manage the estrous cycle and breeding season, and efficient programs for embryos and semen. Programs in use have been essentially adapted from cattle and sheep Research is required to tailor-make these technologies to the intended species. Improvements in our understanding of the physiology and temporal events of estrous, programs for estrous synchrony and superovulation and development of non-invasive techniques. Research in semen and embryo technologies will improve results and reduce costs. New programs using hormonal feed additives are being used to synchronize estrus in sheep and cattle and should to be evaluated in deer and elk due to the benefit of reduced animal handling required. High value is placed on Ontario's White-tail genetics. Semen and embryo programs are not well developed in this species, meaning unrealized opportunities for the industry.

APPENDIX

DUTIES AND TERMS OF REFERENCE OF THE DEER RESEARCH AND SERVICES SUB-COMMITTEE

1) To review deer and elk related research and services being carried out in Ontario and other jurisdictions.

2) To assess the relevance of the current research and services and to determine if they should be continued, expanded or discontinued.

3) To identify potential new areas of research and services.

4) To recommend in order of priority, which existing or new areas of research or services, should be supported.

5) To assemble a state of the deer farming industry report.

6) To identify emerging issues facing the deer farming industry.

7) To submit reports and make presentations to the Ontario Animal Research and Services Committee, encompassing the sub-committee's recommendations and findings.

8) To invite researchers in Ontario to information meetings where progress in deer related research and services can be presented.

9) To ensure liaison and communication among agencies or groups which have a primary interest in the Ontario deer farming industry.

10) To function through a sub-committee chairperson, appointed by the Ontario Animal Research and Services Committee. The appointment of the chairperson will be for two years. The chairperson will not succeed him/herself, but may serve an additional two-year period.

ONTARIO DEER RESEARCH AND SERVICES SUB-COMMITTEE - 1999			
Name	**Location**	**Affiliation**	**Term To**
Mr. Dave Ankney or Designate	Department of Zoology, University of Western Ontario London, Ontario N6A 5B7 Phone: (519) 661-3148 Fax: (519) 661-3412 Email:	OFAH	2000
Dr. Brian Buckrell Committee Chair	Dept., of Population Medicine Ontario Veterinary College, University of Guelph Guelph, Ontario N1G 2W1 Phone: (519) 823-8800 ext. 4011 or (519) 822-0110 Fax: (519) 767-2371 Email: bbuckrell@ovcnet.uoguelph.ca	U. of G.	2002
Mr. John Kerkvliet	Director, Ontario Deer & Elk Farmers Association Fawn Meadows, R. R. # 1 St. Thomas, Ontario N5P 3S5 Phone: (519) 633-1125 Fax: (519) 633-0216 Email: fmeadows@netcom.ca	ODEFA	2003
Teresa or Lyle Renecker	Vice President, Ontario Deer & Elk Farmers Association Reneckers Palace Hillside Elk, R. R. # 5 Stratford, Ontario N5A 6S6 Phone: (519) 393-6425 Fax: (519) 393-6425 Email: ltrenecker@golden.net	ODEFA	2003
Dr. Elliott Salsberg	Animal Health Disease Control Canadian Food Inspection Agency 174 Stone Road West, Guelph, Ontario N1G 4S9 Phone: (519) 837-9400 Fax: Email:salsberge@em.agr.ca	C.F.I.A.	2003
Mr. Howard Smith or Wilma Myelaski	Senior Biologist, Large Mammals, Wildlife Section Ontario Ministry of Natural Resources P. O. Box 7000, 300 Water Street Peterborough, Ontario K9J 8M5 Phone: (705) 755-1964 Fax: (705) 755-1900		2003
Mr. Brian Tapscott	Alternative Livestock Specialist Ontario Ministry of Agriculture, Food and Rural Affairs Wellington Place, R. R. # 1, Fergus, Ontario N1M 2W3 Phone: (519) 846-0941 Fax: (519) 846-8178 Email: btapscot@omafra.gov.on.ca	OMAFRA	2000
Ms. Arden Vaughn	Director, Ontario Deer & Elk Farmers Association Niagara Game Farm, R. R. # 1, St. Catharines, Ontario L2R 6P7 Phone: (905) 688-4570 Fax: (905) 688-4570 Email: lakeland@vaxxine.com	ODEFA	2003
Dr. Bob Wright	Veterinary Scientist (Equine and Alternative Livestock) Ontario Ministry of Agriculture, Food and Rural Affairs Wellington Place, R. R. # 1, Fergus, Ontario N1M 2W3 Phone: (519) 846-0965 Fax: (519) 846-8101 Email: rwright@omafra.gov.on.ca	OMAFRA	1998

ONTARIO EGG LAYER RESEARCH AND SERVICES COMMITTEE

EXECUTIVE SUMMARY

The egg industry continues to experience relatively stable demand for its products. Shell egg sales again increased slightly between 1997 and 1998, and the market for further processed eggs continues to grow. About 20% of eggs produced in Ontario are now sent for breaking and pasteurization. The further processed market is expanding into new products and new uses in the food industry.

Farm-gate egg prices in 1998 were roughly the same as in 1997, as feed prices continued to be low.

Food safety issues continue to be a concern for the egg industry, although *Salmonella enteritidis* isolations are quite rare, and no human food poisoning outbreaks related to eggs were reported during the year.

Calcium metabolism and the related problems of cage layer fatigue, bone fragility and eggshell quality are ongoing challenges in the egg industry.

During 1998, a number of unexplained production drops were noted by producers in the Southwest of Ontario. Several were attributed to Infectious Bronchitis, but the diagnosis and typing of the virus were not timely in some instances. The maintenance and improvement of the Laboratory Services available at the University of Guelph are a top priority for the whole poultry industry.

INTRODUCTION

The egg industry in Ontario continues to evolve, with continuing reductions in producer numbers and increases in average flock size. The increase in flock size was accelerated in 1998 by the first quota increases in many years, provoked by population growth and increased demand. As some producers expand, and invest in new and technologically advanced facilities, so the provincial flock becomes even more efficient.

At the producer level, while efficiency is very high, research continues to be required in such areas as bird health and welfare, food safety, particularly with respect to Salmonella, new product development and the whole area of egg utilization in the food and pharmaceutical industries.

The facilities for conducting poultry research in Canada are dwindling, as are the scientists directly involved with the poultry production sector at research institutions and Universities. Industry has expressed concern with this trend, and a survey conducted by Dr. Roger Buckland, of McGill University, in 1998, pointed the way to some solutions. These included more national consultation and possibly a national organization to coordinate efforts. An initiative is under way to transform the Poultry Industry Council, based near Guelph, ON so that it may become a truly national body.

Another study of resources for poultry research and technology transfer was undertaken during 1998-99, on behalf of the Ontario Egg Producers and the Poultry Industry Council, by Dr. Bill Stevens. This study identified the training of graduate students, and the lack of a coordinating person involved with poultry research and technology transfer, as key problems for the Ontario Poultry industry.

The outcome of these studies shows clearly that Canada and Ontario have the capability to conduct poultry research and disseminate results, but that there are great opportunities to increase the volume of useful work, and enhance industry's ability to apply it, if the appropriate actions are taken. Ontario, with the largest poultry industry of any province in Canada, has an important role to play in this activity.

COMMITTEE ACTIVITY

The Committee met on September 1, 1999. Four of the six members were present. Joint sessions with the other poultry committees were held as well as the meeting to consider strictly egg research and service issues.

STATE OF THE INDUSTRY

The number of egg producers continues to decline. At the end of 1998, there were 449 registered producers with 7,135,043 hens. This compares with 466 producers and 6,932,857 hens at the end of 1997. The increased quota reflects increased demand from both table and further processed markets. Average flock size for 1998 was therefore 15,890 hens.

There are five hatcheries supplying day-old chicks to the industry, with five different strains predominating. The majority (>90%) of these lay white eggs. Brown eggs are produced for a few niche markets.

Egg prices have followed feed prices and have changed very little in the past twelve months. The prices set for Ontario on June 29, 1999 were:

	$/doz
Canada A Extra Large	1.25
Canada A Large	1.25
Canada A Medium	1.15
Canada A Small	0.75

Levy of 22.02 cents/doz is deducted from all eggs for administration (CEMA and OEP), advertising and promotion, and industrial product removal.

In 1998, 11,427,756 boxes of 15 dozen eggs were graded, up 9.7% from 1997. Of these, 2,137,627 boxes were sent for breaking and pasteurization, up 8.6% from 1997. This represents approximately 19% of eggs graded. Significant volumes of US eggs are imported to supplement Ontario surpluses used for breaking. In the US, the proportion of eggs going to further processing is approaching 30% and some flocks are dedicated to produce breaker eggs for their entire production cycle.

EMERGING ISSUES

We have referred previously to the challenges encountered by producers as flock size increases, with the accompanying increase in manure production. Where this is not accompanied by an increase in available land, utilization of nutrients in manure becomes increasingly difficult. A majority of new egg production units use high-density cage systems and produce manure with a dry matter content around 25%. This is ideal as a fertilizer for corn or pasture, but the balance of nutrients is such that repeated application leads to unwanted increases in soil phosphate levels. Nutrient management plans are accepted as a solution to this problem, but time will be needed to completely phase in these new initiatives.

The use of genetically modified corn and soybean varieties in feeds for poultry has been generally accepted by producers, but, led by consumers in Europe, some Canadians are beginning to ask questions concerning the safety of food produced in this way. Industry will have to address these questions honestly and without hesitation.

RESPONSE TO 1998 RECOMMENDATIONS

Recommendation 1. Food safety.	Industry has embraced HACCP and HACCP-based programs but the underlying research in some areas remains to be done. Work has been initiated by Dr. Key in the area of standardization of the PCR technique for the detection of Salmonella spp. from tissue and environmental samples, and this is to be extended to deal specifically with S. enteritidis and S. typhimurium.
Recommendation 2 Calcium metabolism	While there are no projects registered on the OMAFRA program (as of July 1, 1999, Dr. Leeson and a graduate student began a project, partly funded by Ontario Egg Producers, to study cage layer fatigue. No other work is in progress in this area.
Recommendation 3 Egg quality and composition	Dr. Mine continues his work in the Dept of Food Science, funded in part by the Ontario Egg Producers. Dr. Leeson has a project under way to investigate the enrichment of eggs with nutrients in addition to omega-3 fatty acids. Dr. Gibbins continues her work on modification of the lysozyme gene in egg albumen.
Recommendation 4 Poultry health	There is no work on the specific area of Infectious Bronchitis detailed in our 1998 recommendation. The University of Guelph diagnostic service continues to operate but there are difficulties in obtaining timely service in the area of virology, one of the key requirements of the egg industry.
Recommendation 5 Poultry welfare	There is no work on beak trimming. Project 23570, while not involving caged layers, contains elements which are of interest to egg producers

SUMMARY AND DISTRIBUTION OF 1999 RECOMMENDATIONS

Recommendation	AAFC(CFIA)	ARIO	OMAFRA	OTHER
Food safety	X	X	X	
Calcium metabolism	X	X		
Egg composition etc	X	X		
Poultry health		X	X	
Poultry welfare	X	X		

1999 RESEARCH & SERVICES RECOMMENDATIONS

RECOMMENDATION #1 **PRIORITY 1A**
TO AAFC (CFIA), ARIO, OMAFRA

FOOD SAFETY

Develop improved methods for the detection and control of the important Salmonella serotypes affecting the egg industry.

DETAIL

Salmonella continues to be a perceived threat to the egg industry, although incidence of *S.enteritidis* is considered low, compared with some other jurisdictions. There is a need to develop and test competitive exclusion products, probiotics and vaccines, and to facilitate registration of these products. Rapid testing methods are available but they have not been adequately tested and are very expensive.

While *S.e.* remains the serotype of greatest concern to the egg industry, *S.typhimurium* DT 104 is also a concern because of its ubiquitous nature and apparent resistance to antibiotics.

BACKGROUND

Ontario continues to experience relatively low incidence of *S.e.* in routine testing in the egg industry. Environmental testing of layer and pullet houses takes place at least once for each flock. Eggs from layer houses found to be positive are diverted from the table market for pasteurization. Pullets on environmentally positive premises are slaughtered and owners compensated from an industry-financed fund. However, improved methods are needed to improve detection, to provide control and to prevent re-contamination.

The control and eradication of rodents is known to be critical in reducing incidence of all Salmonellae, yet few new developments in rodent control have been seen in the past two decades.

The CEMA now has a HACCP-based voluntary program for egg producers, which provides guidelines for improved food safety. Ontario Egg Producers have a voluntary HACCP program and plan to introduce third-party certification in 1999 or 2000. Improved testing and control procedures would fit naturally into these valuable programs.

RECOMMENDATION #2 **PRIORITY 1B**
TO ARIO

CALCIUM METABOLISM

Continue the search for increased knowledge of the metabolic pathways of calcium, phosphorus and related nutrients as they affect eggshell structure and quality, bone integrity and cage layer fatigue.

DETAIL

Laying hens now routinely consume less than 100 g of feed daily, and this situation is aggravated as they come into production at ever-decreasing body weights. Calcium may be a limiting nutrient in these circumstances and this can lead to cage layer fatigue early in lay and/or additional problems later in the laying cycle. Research is needed to clarify many aspects of calcium metabolism and the interaction of calcium with a variety of other nutrients. These are vitally important in the maintenance of shell quality and bone integrity. Shell quality affects income from eggs throughout the production cycle, while bone integrity may be an important welfare consideration when spent hens are captured and shipped at the end of their lives.

BACKGROUND

Layers have been selected for greater feed efficiency for many years. One of the ways this has been accomplished is to reduce the adult body weight, and thereby the maintenance requirement. In turn, birds consume about 15 g less feed on a daily basis than the birds of even ten years ago. However, the same or a higher egg output is expected, and therefore the nutrients required for production have to be included in the smaller daily intake of feed. Calcium is a critical nutrient, because, when birds are laying at over 90% and also adding to their body weight, they may be temporarily in negative calcium balance. If this continues for more than a very short period, considerable damage may be done. The possible outcomes may include; cage layer fatigue resulting in increased mortality, poor egg shell quality, loss of bone integrity through osteoporosis, and possibly other problems.

A better understanding of the metabolism of calcium and other associated nutrients would assist in developing nutrition and feeding programs for today's and tomorrow's laying hens.

RECOMMENDATIN #3 **PRIORITY 1B**
TO ARIO

EGG QUALITY AND COMPOSITION, FUNCTIONALITY OF EGG COMPONENTS, NEW AND VALUE-ADDED PRODUCTS

Develop new added-value eggs and egg products, novel ways to utilize eggs, and conduct research into the functionality of egg components to enhance their value to the food industry.

DETAIL

The egg industry has enjoyed considerable success with the introduction of omega-3 enriched eggs. These now enjoy market penetration of about 5% of shell egg sales. However, some problems in the production of hens when fed flax require additional research.

Enrichment of eggs with additional nutrients may provide opportunities to further add to their value.

The discovery that laying hens can be immunized using foreign antigens, and will then deposit antibodies into their egg yolks, has spawned a vibrant new industry. Continued research is needed to develop the details of this technology and to extend it to new antigens, particularly those related to human pathogens. In general, the production of antigens from hens is cheaper and less invasive than other methods. With some antigens, the entire egg yolk can be used in the subject animal to prevent disease, while in others, the immunoglobulins must be extracted and purified. These technologies require ongoing research.

While producers regard the shell egg market as most important, about 20% of eggs now go to the further-processed market and this volume is growing. (In the US, 30% of eggs are further processed.) Egg components are being used in an expanding range of manufactured foods, but research is needed to improve functionality of yolks, whites and various other products. In many of the markets, egg products compete with other materials derived from milk, and continuing research is needed to keep egg products competitive.

RECOMMENDATION #4A **PRIORITY 1B**
TO AAFC, ARIO

POULTRY HEALTH

Research and development work is required to enhance the capability to diagnose and type the range of Infectious Bronchitis viruses present in the Ontario egg industry.

DETAIL

The Poultry Industry urgently needs an improved capability to diagnose and identify the various types of Infectious Bronchitis present in the egg industry. In 1998-99, serious problems arose and producers and their practicing veterinarians had difficulties in securing adequate and timely information to deal with the situation.

BACKGROUND

While primary disease diagnosis is, in many cases, carried out by private veterinarians, the follow-up processes using histology, microbiology, etc. must be carried out at the University of Guelph laboratories. It is important to the industry that these services are maintained and improved. The laboratories must be capable of using all available current technology to keep Ontario's poultry industry competitive.

A long-term problem in the egg industry has been Marek's disease, and while this condition is adequately controlled by vaccines in most cases, occasional breaks occur which cause major concern, since no new vaccines are apparently in the pipeline.

The industry also has a need for improved disease surveillance. This would embrace not only new diseases, but also data on vaccine effectiveness, standard antigen titres, etc. as background information.

RECOMMENDATION #4B **PRIORITY 1B**
T0 AAFC, ARIO

SHORT-TERM INVESTIGATION FUNDS

OBJECTIVE

To establish a source of funds for short-term investigations of emerging disease conditions or other emerging industry priorities.

BACKGROUND

Every year new disease conditions or unusual presentations of recognized diseases are identified in the Ontario poultry industry. In many instances these have significant potential consequences for the Ontario industry. The initiation of formal research projects to investigate these sorts of problems involves identifying funding sources, sending proposals through industry and outside funding agencies and there is often a significant delay in initiating the research and providing useful information to the industry. In many of these cases, short-term practical research projects may either solve the problem, determine if longer-term research is warranted and provide immediate practical information to the industry. Examples of this type of project might be to evaluate the importance of an emerging condition to the poultry industry, to verify if an agent isolated from a disease condition is indeed a pathogen, to determine if current vaccination programs, licensed vaccines or other treatments will be effective in preventing the condition, or perhaps to put together an epidemiologic profile of an emerging condition that will lead to practical recommendations to the industry on prevention or direct further research.

There is presently no source of funds for these practical short-term projects. An application procedure would be established to allocate these funds, presumably through a joint university/industry review panel.

RECOMMENDATION #5 **PRIORITY 2B**
TO AAFC, ARIO

ANI MAL WELFARE

Conduct research on the technology, efficacy and consequences of early (7-10 day of age) beak trimming for laying pullets. Conduct research on catching and transportation of spent hens to minimize bone breakage.

DETAIL

Most Ontario flocks are beak-trimmed between six and ten weeks of age. Prior research has shown that earlier beak trimming causes less long-term damage and trauma to the pullets. Producers are looking for improved technology to make the job of early beak trimming more uniform and effective.

End-of-lay hens have very little value and disposal sometimes creates a problem. Data gathered at processing plants in England has indicated high levels of bone breakage. Improved methods of catching birds and transporting them would be beneficial.

BACKGROUND

Egg producers are urged to conform to the Recommended Codes of Practice for Poultry in all respects. Critics point to beak trimming as an area of concern. Improved methods would help producers and might also deflect some of the criticism.

Because of its low value, the end-of-lay hen receives little consideration, but it is a major concern of animal welfare advocates. The major problems are dead-on-arrival numbers, and broken or damaged bones. The former may be addressed by better scheduling and transport design.

Bone breakage is often a consequence of poor cage design, but this is largely with older cages and the newer ones have full-width openings which make it easier to remove the hens. Nutritional or other treatments which might improve bone integrity would be valuable for reducing bone breakage prior to and during transportation.

ONTARIO EGG LAYER INDUSTRY RESEARCH AND SERVICES COMMITTEE MEMBERSHIP 1999

Chair: Dr. Peter Hunton,
Ontario Egg Producers,
7195, Millcreek Drive,
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Producer Board Representative

Mr. Craig Hunter,
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Dr. Steve Leeson,
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University of Guelph Representative

ONTARIO EQUINE RESEARCH AND SERVICES COMMITTEE REPORT

EXECUTIVE SUMMARY

This report was prepared based on discussions held at the annual meeting on September 21, 1999. The report attempts to provide an factual indication of the state of the Equine industry in Ontario in 1999. Available industry data have changed very little since the survey reports of Wright and Cation (1996) and Evans (1998). Overall there is a sense of optimism in the industry in Ontario as numbers of people participating in the industry continues to apparently increase. Quality of horse shows remains strong and efforts are being made by various industry sectors to encourage and train young people to become involved. An example of this is the growth in dressage activity with a report that more than 10,000 Canadians are currently active members of the various dressage organizations. Optimism is also present in the Thoroughbred and Standardbred racing sectors. The Ontario Sire Stakes program has provided sufficient encouragement to Ontario breeders to retain quality stallions and mares capable of producing offspring that can compete with any in the world. Examples of our competitiveness are present at all major competitions, the most recent of which was the Breeders' Crown races held at Mohawk Raceway in late October. Yearling sales prices for Thoroughbreds showed significant increases from 1998 and there were greater changes in the Standardbred sector. The Canadian Classic Yearling sale held in September averaged 3 percent higher than the record established in 1998. Purses also have increased significantly reflecting increased returns from off-track wagering and the appearance of slot machines at many tracks.

Problems facing the industry continue to be associated with producing sufficient high quality stock for industry needs and in keeping these horses healthy and injury free. The industry has difficulty retaining top quality horses. This problem can be viewed as positive in some respects as it indicates a strong market, particularly in the United States, for quality Canadian horses. Short fields (fewer than ideal numbers of horses entered in a race) remain a problem in the Thoroughbred racing sector at certain times of the year. The problem is also present in the Standardbred sector but to a lesser degree and appears to be improving more rapidly than with the Thoroughbreds. Such problems are only going to be solved by the development of highly structured breeding and testing programs supported by the industry as a whole. Incentives such as those of the Ontario Sire Stakes program in racing are helping and similar efforts might also aid the development of Canadian-breds capable of competing at the highest levels in Canadian Equestrian Federation organized competitions.

Research priorities remain similar to last year. Respiratory and lameness problems continue to lead the list. The reasons behind these problems are multifactorial and, consequently, encompass a wide variety of efforts to reduce or eliminate them. The various projects funded entirely or in part by OMAFRA resources are listed later in this report. Committee members felt strongly that more effort was needed in the dissemination of research information to the industry and the continuing education of those in the industry charged with the production and management of horses.

COMMITTEE ACTIVITIES

The annual meeting of the committee was held on September 21st at the University of Guelph. Ten members were in attendance and input for the meeting was received from 2 members who were unable to attend. Oral reports were received from various industry segments. The chair of the OERSC reported that he had attended the CARC Animals Committee in Ottawa on November 23rd, 1998 and presented a report on the state of the industry. The committee received a report from Dr. L. Viel on the research being conducted with OMAFRA support at the University of Guelph. Dr. Andrew Clarke also reported on the research program and other initiatives underway at the Equine Research Centre Inc. Dr. Robert Wright reported on the extension work he has performed for the industry in his role with OMAFRA. He also provided examples of the publications he has prepared for industry consumption.

Research priorities were then discussed in general terms. In the discussion that followed it was clear that, in the view of the meeting participants, previously stated priorities had not changed. Although progress is being made on the priority issues the same problems remain as serious concerns, a clear indication of the complexity of the problems. These priorities are listed below.

There was also discussion of the continuing need for the dissemination of information through extension programs, seminars, and special courses that could be taken by professionals and other interested parties in the industry.

STATE OF THE ONTARIO EQUINE INDUSTRY

The committee reported that there is a positive attitude amongst industry stakeholders at present regarding the overall health of the industry. There remain areas of concern, however, particularly with the quantity of top quality horses capable of competing at international levels The committee perceives that there is good demand for horses as reflected by the strengthening prices for yearlings (various yearling sales average prices were at all time record levels in Canada this Fall).

Examples of industry growth are found in the numbers of participants in various horse related activities in the province and the country. An example is the growth in dressage activities across the country. It is reported that there are over 10,000 registered participants in this activity, which was recently considered a very minor segment of the industry. The growth in purse monies in the racing industry has also had a stimulating effect on number of participants in this segment. New owners have accounted for a significant proportion of these participants.

The professional and amateur sport horse sector consists of those horses involved in competing at many different horse shows across the province. There is a continuing strong demand for sport horses with many of them leaving the country, partially because of the weakness of the Canadian dollar. Number of mares bred appears to be increasing and those bred are of high quality. This indicates that prices should remain strong for the next few years but the quality of the animals available will be improved to support those prices.

The Sport horse sector has become very optimistic about the future based on increasing number

of participants at local and regional horse shows. In many cases the number of participants has more than doubled over the past 2-3 years. These participants represent the industry's base and should provide good momentum for future growth.

The Annual Statistical Report of the Ontario Racing Commission for 1997 (the latest currently available) indicates a wagering total for Ontario that is approximately $1.2 B, up about 10 %, and attendance up slightly over the previous year. Preliminary information for the Ontario Jockey Club indicates that the rise in attendance and wagering continued through 1997. These increases are thought to be attributable to the intertrack and off-track telecasting of racing programs. All of these data are encouraging to Ontario breeders who have had several difficult years when demand and prices were depressed. It also reflects the improvement in quality of breeding stock and in performance of offspring over the past 3 to 4 years.

Progress is continuing on the streamlining of the industry to improve efficiency and effectiveness in promoting the product. The Ontario Horse Racing Industry Association (OHRIA) has been formed to speak for and add direction to the entire racing industry. The Canadian Standardbred Horse Society and the Canadian Trotting Association have amalgamated to form Standardbred Canada to eliminate duplication of effort and costs and to enable more rapid decision making in the Standardbred sector. The industry as a whole remains very supportive of research efforts and currently provides over 60 percent of the total dollars available for research in Ontario.

A recent study of the industry spearheaded by the OVMA and the OAEP produced the following responses when asked "What is the #1 horse health issue in Ontario?"

1. Respiratory problems and allergies
2. Lack of information on alternative therapies
3. Education of new owners on general husbandry
4. Improper nutrition and education about sound nutrition
5. Preventive medicine - worming
6. Poor general husbandry practices
7. Hay and water quality

ECONOMIC IMPACT SUMMARY

The Ontario equine industry is a diverse industry divided into three major commercial sectors: Racing horses, Sport horses, professional and amateur, and Pleasure and hobby horses. There are a total of 30 Breed Registration Associations. The Ontario equine industry employs an estimated 79,000 people, full-time and part-time (OMAFRA survey). Total revenues generated from the equine industry are in excess of $4 billion annually (OMAFRA survey). Much of this money is spent in rural Ontario supporting service and supply segments.

Surveys carried out by the Ontario Ministry of Agriculture, Food and Rural Affairs show that there are 2,267 Ontario Equestrian Federation members, 500 Ontario Quarter Horse Association members, 600 Ontario based Canadian Thoroughbred Association members, and 2,505 Ontario based Canadian Standardbred Horse Society members.

The Pleasure and hobby horse sector is the largest of the equine industry, and the least known in terms of its impact on the economy. Combined, amateur and professional sport horses and pleasure/hobby horses sectors represent 63% of the total revenue generating industry. This sector accounts for significant purchasing of horse products, such as feed, equine health products, tack, farrier and health services, etc.

It is estimated that in Ontario every thousand horses consume about $400,000 worth of grain, hay and commercial feed products and about $150,000 in bedding material. Based on an estimate of 278,000 non-racing horses this represents approximately $110 million of commercially produced mixed feeds, grains and hay. Of this, commercially prepared feed sales represents approximately $50 million annually. It is estimated that approximately 50% of all horses in Ontario are fed home-grown grains, hay and possibly a mineral (salt) supplement and no commercially prepared feed. It is probable that these horses are being fed unbalanced diets to their long-term detriment.

Table 1. Economic Impact of the Sport and Pleasure Horse Industry in Ontario

Inputs	**Average Expenditure per 1000 Horses per Annum $**	**Total Estimated Economic Impact $**
Feed & Grains	393,000	104,145,000
Bedding	122,000	32,330,000
Herd Health	218,000	57,770,000
Total	**733,000**	**194,245,000**

Source: OMAFRA survey

It is estimated that the Ontario Racing industry is a $2.0 billion industry, which includes livestock, salaries, real estate, transportation, wagering and secondary industries. With racing at 18 provincial race tracks (16 Standardbred tracks, 2 Thoroughbred tracks) there are 24,600 people employed directly by the industry, and another 5,600 people employed part time. The purchases of goods and services by the race horse industry is outlined in Table 2.

Table 2. Economic Impact of the Race Horse Industry in Ontario (from OMAFRA survey)

Inputs	**Average Expenditure per 1000 Horses per Annum $**		**Total Estimated Economic Impact $**	
	Standardbred	**Thoroughbred**	**Standardbred**	**Thoroughbred**
Feed & Grains	498,000	606,000	21,145,000	5,000,000
Bedding	125,000	143,000	6,180,000	3,550,000
Herd Health	450,000	359,000	18,200,000	2,630,000
Total	**3,212,000**	**3,490,000**	**61,349,000**	**28,000,000**

The racing industry consists of a total of approximately 28,000 horses, with 19,010 Standardbreds (18% of Standardbreds are Trotters), 7,990 Thoroughbreds and 342 racing Quarter Horses (Table 3). These numbers included 6,000 breeding mares and stallions needed to produce racing horses.

Table 3. Race Horse Population in Ontario by Breed (data from OMAFRA survey)

	Thoroughbreds	Standardbreds	Quarter Horses
Active Racing Horses	3,303	9,069	105
Foals & Yearlings	2,764	5,921	127
Mares & Stallions	1,933	4,020	100
Totals	**7,990**	**19,010**	**342**

The total value of equine meat exported from Ontario in 1993 was $4.4 million. This is down from a peak in exports in 1989. The majority of all horses processed are slaughtered at a large plant in Owen Sound. Approximately 80% of all the horses processed in Ontario are brought in from the U.S.A.

Other results from the OMAFRA survey:

* There are an estimated 293,000 horses in Ontario
* The Ontario horse industry maintains a healthy trade in horses, exporting to other provinces and countries approximately 30% of progeny produced in Ontario.
* The Ontario horse industry spends an estimated $40.2 million annually on employment
* The Ontario horse industry directly employs an estimated 79,000 people and requires approximately 136 million employment hours annually.
* Estimated total annual expenditures by the Ontario horse industry is $567 million.
* Estimated total assets and investments held by the Ontario horse industry is $5.50 billion.
* The largest investments for both the non-racing sector and the racehorse sector are for land, buildings and horses.

EMERGING ISSUES IN THE INDUSTRY

As stated above the committee agreed that research priorities remained as stated in the previous report. There is the realization that welfare issues are an important part of the public concern with the industry and that we are currently doing little work in this area. The committee does not feel that scarce research dollars should be diverted from current research, but welfare issues need to be given consideration if additional research funding becomes available. Questions are also arising concerning the use of nutraceuticals in the prevention of health problems. Answers for these nutraceuticals questions are not available and this may have to be addressed in future research efforts. The availability and cost of quality forage is also a concern for those owners, trainers and managers purchasing these feedstuffs. The development of a quality assessment system would be helpful in determining standards of forage quality for horses.

DISTRIBUTION OF RESEARCH PRIORITIES

Research	Priority	U of G	ERC	OMAFRA	ARIO	CARC
Lameness	1	X	X		X	
Respiratory	1	X	X		X	
Performance and M/S system	1	X	X		X	
Gastrointestinal function	2	X			X	
Reproduction	2	X	X		X	
Anesthesia	2	X			X	
NON-RESEARCH						
Extension	1	X	X	X		
Laboratory Services	1	X		X	X	

RESPONSE TO 1998 RECOMMENDATIONS

In this report research priorities are presented in the same format as presented to ARIO in the program review conducted during the summer of 1997. The use of this format should eliminate any possible confusion of interpretation of priorities.

RECOMMENDATION #1 **PRIORITY 1B**

LAMENESS (A CONTINUING PRIORITY)

OBJECTIVE 1 To investigate methods for the prevention and treatment of lameness and trauma induced injury in equines.

GOAL 1.1: To investigate limb abnormalities (osteochondrosis, angular limb deformity) with emphasis on prevention, early diagnosis, repair and rehabilitation.

GOAL 1.2: To investigate traumatic injuries to joints and long bone fractures with emphasis on methods of prevention and repair.

GOAL 1.3: To examine the structure and biomechanics of the equine hoof.

GOAL 1.4: To further develop Magnetic Resonance Imaging of the horse.

Response

ARIO: *It was noted in the 1998 report of the equine subcommittee that the previous year's priorities had not changed. Hence, the above recommendation is reprinted from the 1996 report*

of the equine subcommittee. The 1997 report presents the 1996 priorities in the same format (Objectives and Goals) as used in the Equine Research Program Review document presented to ARIO in June 1997. Rather than restate the Objectives and Goals that pertain to the above recommendation, the ARIO acknowledges support of the recommendation as demonstrated through the approval of the 1997-2001 Equine Research Program. Research can be done under the pertinent Objective to address the above recommendation.

(This response was the same for all recommendations and is not repeated again in this document.)

UNIVERSITY OF GUELPH: The recommendations concerning Equine Lameness are being addressed in 1998/99 by the following research projects:

Project #	Leader	Title
11860	Hurtig, M.	Repair of damaged joint surface using fresh and cryopreserved osteochondral allographs in the horse using arthroscopic surgery
14890	Hurtig, M.	Resurfacing damaged joints using reconstituted cartilage tissue
16230	Thomason, J.	Variation in hoof capsule strain: causes and implications for hoof growth
17610	McCutcheon. J.	Ion regulation and substrate utilization in skeletal muscle: effects of exercise and training
17630	Thomason, J.	A study of the effect of hoof shape on its mechanical behaviour using finite element analysis
18140	Thomason, J.	Assessing the risk of hoof cracks in horses in relation to nutrition and environment
18560	McCutcheon, J.	Effect of exercise training on glucose regulation in growing horses on a high energy diet

RECOMMENDATION #2 **PRIORITY 1B**

RESPIRATORY PROBLEMS

OBJECTIVE 2 To characterize, prevent and alleviate respiratory disorders in horses (a continuing priority)

GOAL 2.1: To investigate the pathogenesis, treatment and control of viral and bacterial infections, including Rhodoccoccus equi in foals.

GOAL 2.2: To investigate the pathology of inflammation, its development in foals and its role in exercise induced pulmonary hemorrhage and allergic small airway disease.

GOAL 2.3: To continue to develop diagnostic methods and therapeutics necessary for the characterization and alleviation of respiratory disorders.

UNIVERSITY OF GUELPH: The recommendations concerning Equine Respiratory Disease are being addressed in 1998/99 by the following research projects:

Project #	Leader	Title
11810	Prescott, J.	Immunity to Rhodoccoccus equi pneumonia of foals
11820	Viel. L.	Allergic airway disease in horses: assessment of the role of inflammation, treatment and improved diagnostics
16240	Viel. L.	Allergic small airway disease in racing horses: Assessment of inhaled bronchodilators using treadmill exercise testing and bronchoalveolar lavage
17580	Prescott, J.	How does hyperimmune plasma protect against Rhodoccoccus equi pneumonia in foals?
18570	Yager, J.	Immunity to Rhodoccoccus equi and the pathogenesis of infection

RECOMMENDATION #3 **PRIORITY 1B**
FACTORS AFFECTING PERFORMANCE (A CONTINUING PRIORITY)

OBJECTIVE 3 To investigate factors affecting performance of horses as related to the musculoskeletal system.

GOAL 3.1: To investigate cardiovascular, respiratory and thermoregulatory function, and the regulation of fluids and electrolytes during exercise under varied ambient conditions.

UNIVERSITY OF GUELPH: The recommendations concerning factors affecting performance of horses as related to the musculoskeletal system are addressed in the following projects.

Project #	Leader	Title
11840	McCutcheon, J.	Fluid and ion balance in exercise performance
13050	Geor. R. J.T	hermoregulation in the exercising horse: alterations in performance associated with exercise induced hypothermia, and effects ...
17610	McCutcheon, J.	Ion regulation and substrate utilization in skeletal muscle: effects of exercise and training
17640	Staempfli, H.	Are total body electrolyte imbalances involved in clinical and subclinical manifestations of exercise related myopathies in racehorses?
18560	McCutcheon, J.	Effect of exercise training on glucose regulation in grwoing horses on a high energy diet

RECOMMENDATION #4 **PRIORITY 2B**
GASTROINTESTINAL FUNCTION (A CONTINUING PRIORITY)

OBJECTIVE 4 To investigate nutritional and physiological factors which affect gastrointestinal function.

GOAL 4.1: To investigate the nutrient composition of common feeds and the influence of certain nutrients and vitamins on growth, development and racing performance.

GOAL 4.2: To investigate the causes and treatment of small and large bowel enteritis.

GOAL 4.3: Epidemiology and transmission of intestinal parasites in equids.

UNIVERSITY OF GUELPH: The recommendations concerning nutritional and physiological factors which affect gastrointestinal function are addressed in the following projects.

Project #	Leader	Title
13150	Dobson, H.	Diagnoses of gastrointestinal ulceration in neonatal foals
17620	Staempfli, H.	Efficacy of oral bacitracin in the treatment of acute severe idiopathic colitis in the horse

Equine Research Centre Inc. actions (non-OMAFRA funded):

RECOMMENDATION #5 **PRIORITY 2B**

REPRODUCTION (A CONTINUING PRIORITY)

OBJECTIVE 5 To investigate factors related to reproductive problems.

GOAL 5.1: To study the mechanisms of pregnancy establishment and maintenance in the mare.

GOAL 5.2: To study gamete (ovum and sperm) physiology to promote increased fertility in horses.

UNIVERSITY OF GUELPH : *Recommendations concerning reproduction are addressed in the following project.*

Project #	Leader	Title
17600	Betteridge, K.	Investigation of the adhesion between the conceptus and the endometrium during early pregnancy in the mare

RECOMMENDATION #6 **PRIORITY 2B**

SEDATION, ANALGESIA, AND ANESTHESIA (A CONTINUING PRIORITY)

OBJECTIVE 6 To investigate methods of reducing the risk and complications of equine sedation, analgesia, and anesthesia.

GOAL 6.1: To investigate cases of cecal impaction as a consequence of anesthesia.

GOAL 6.2: To study cardiovascular parameters and recovery characteristics following the use of common sedatives.

GOAL 6.3: To study hemodynamic stability during general anesthesia.

Recommendations concerning reducing the risks associated with equine sedation and anaesthesia are addressed in the following project.

Project #	Leader	Title
22070	McDonell, W.	To investigate methods of reducing the risk and complications of equine sedation, analgesia, and anaesthesia

1999 RESEARCH & SERVICES RECOMMENDATIONS

*1.*The OERSC recommends that research priorities remain as currently stated in the ARIO approved program for the current year. The consensus of the meeting was that problems associated with respiratory function and lameness, including growth associated abnormalities continue to present significant difficulties in the production and maintenance of performance horses. These are multifaceted problems that require research attention from a variety of directions. The committee is satisfied that available funds are being well utilised but emphasises the need for efforts to attract additional research funding.

*2.*The committee also sees a strong demand from the industry for information on the prevention of such problems as well as the proper management of horses. The committee commends the efforts of Dr. Robert Wright in making information available to the industry in several different formats. These efforts need to be continued and expanded.

APPENDIX

Duties and Terms of Reference of the Committee

1.To review equine research and service being carried out in Ontario

2.To discover and disclose problems facing the equine industry that require investigation

3.To assess the relevance of research and service programs and suggest priorities for research efforts, especially those funded by OMAFRA, and to recommend what programs undeway should be continued, expanded or terminated.

4.To estimate the cost involved to conduct the recommended research and service programs and to supply cost benefit information if possible.

5.To supply information and recommendations in written reports to the OARSC.

6.To function through an animal species chairperson who will be appointed through OARSC. The appointment of the chair will be for a 4 year period. He or she will not succeed themselves but may serve an additional 4 year period with at least a 4 year absence between each period.

ONTARIO EQUINE RESEARCH AND SERVICES COMMITTEE DIRECTORY

Name	Address	Affiliation	Appointment
Dr. Keith Betteridge	Biomedical Science University of Guelph Guelph ON N1G 2W1 Tel: 519-824-4120 ext. 8258	Research - Reproduction	1999
Dr. John Burton (Chair)	Animal & Poultry Science University of Guelph Guelph ON N1G 2W1 Tel: 519-824-4120 ext. 3680 Fax: 519-836-9873	Research - Nutrition	1999
Dr Andrew Clarke	Equine research Centre Guelph, ON N1H 6R8 Tel: 519-837-0061 Fax: 519-767-1081	Director, ERC	1998
Dr. Mike Corridini	Tottenham Animal Clinic 17 Queen St. N., Box 476 Tottenham, ON L0G 1W0 Tel: 905-936-3131	Ontario Equine Practitioners	1999
Dr. Gerald Dinelle Jr	45 Pinnacle Cres. Guelph ON N1K 1P6 Tel: 519-763-7479	Industry - Standardbred Trainer	1999
Mr. Jay Hayes	Northridge Farms P.O. Box 9 Cheltenham ON L0P 1C0 Tel: 905-838-1639	Industry - Hunter, Jumper, International Competitor	1999
Dr. James Henderson	R.R.#1 Inglewood ON L0N 1K0 Tel: 905-459-1333	Industry - Pleasure & Quarter Horse, Equine Practitioner	1998
Dr. Arthur King	Ontario Equestrian Federation 1185 Eglington Ave. E Ste. 603 North York ON M3C 3C6 Tel: 416-426-7232 Fax: 416-436-7355	Ontario Equestrian Federation - President, Hunter & Jumper	1998

Name	Address	Affiliation	Appointment
Mr. Mel Livingston	P.O. Box 1066 King City ON L0G 1K0	Co-ordinator of Farrier Program - Seneca College	1998
Mr. Bernard McCormick	Windfields Farm P.O. Box 67 Oshawa ON L1H 7K8 Tel: 905-725-1195	Industry - Thoroughbred Breeder, Farm Manager	1999
Dr. Wayne McDonell	OVC, University of Guelph Guelph ON N1G 2W2 Tel: 519-824-4120 ext. 4095	Research	1998
Dr. Dan McMaster	210 Campbellville Rd. Campbellville ON L0P 1B0 Tel: 905-659-1923 Fax: 905-245-5916	Industry - Equine Practitioner	1999
Dr. Pat Meyers	R.R.#2, Hillsburgh, ON N0B 1Z0 Tel: 519-855-9823	Equine Reprodcution Specialist	2000
Dr Richard Spratt	Ralston Purina Canada, Inc. 404 Main st. P.O. Box 250 Woodstock, ON N4S 7X5 Tel: 519-539-3724	Feed Industry	2000
Dr. John Thomson	R.R.#3 Woodstock ON N4S 7V7 Tel: 519-537-7836	Canadian Standardbred Horse Society Broodmare	1998
Ms. Melissa Todd	R.R.#1 Bright ON N0B 1E0 Tel: 519-632-8916	Industry - Hunter/Jumper	1998
Dr. Laurent Viel	Department of Clinical studies University of Guelph Guelph ON N1H 6R8 Tel: 519-824-4120 ext. 4067	Coordinator, Equine Program; Respiratory specialist	2000
Dr. Robert Wright	OMAFRA, Animal Industry Br. Wellington Place R.R.#1 Fergus ON N1M 2W3 Tel: 519-846-0965 Fax: 519-846-8101	Extension OMAFRA	1998

ONTARIO FUR-BEARING RESEARCH AND SERVICES COMMITTEE

EXECUTIVE SUMMARY

The fur-bearing sub-committee met on September 8, 1999 and reviewed research being conducted in Canada and internationally. The sub-committee reviewed the state of the fur farming industry, discussed significant industry issues and needs and subsequently identified four potential research recommendations and one service recommendation. The unranked recommendations were subsequently reviewed and prioritized on October 6, 1999 by the directors of the Ontario Fur Breeders Association as follows:

Research

1.C orona Virus in Mink;
2.Pr evalence and Economic Impact of Aleutian Disease in Mink;
3.A n evaluation of the availability, accessibility and cost of "opportunity feeds" for fur farmers;
4.F oot Pad Necrosis in Mink.

Services

1.Di agnostic and Aleutian Disease Serology Laboratories and Services.

INTRODUCTION

The fur-bearing sub-committee held its annual meeting on September 8, 1999 at the Government of Ontario building at 1 Stone Road West in Guelph. Introductions were made amongst seven of eleven members of the sub-committee attending the meeting.

Katherine Hoffman, Animal Research Analyst, OMAFRA provided a synopsis of the following topics:

- Ontario Agricultural Services Coordinating Committee (OASCC);
- Agricultural Research Institute of Ontario (ARIO) – Administers and allocates funding within the OMAFRA/University of Guelph (UofG) contract. Call for Project Proposals are distributed within the UofG on a competitive and ongoing basis. ARIO reviews the University of Guelph's Animal Program every 4 years and the next review is scheduled for 2001. It was acknowledged that the recommendations from "Minor Species" sub-committees such as fur bearing, deer and goats are not formally presented to ARIO, since these species are not included in the Animal Program. The sub-committee again expressed concern about this process.
- OMAFRA Special Research Fund – It was noted there was only one application received last year from the mink farming sector and that proposal was turned down due to lack of "apparent" industry support. It is anticipated a similar Special Research Fund, outside of the OMAFRA/University of Guelph contract, will be announced for 1999/2000. At the time of the meeting it was uncertain whether or not "Alternative Crops and Livestock" would again be one of the eligible areas for funding. It was expected the call for project proposals will go out in December 1999. The sub-committee recommended that a mailing list of current fur researchers be complied, so call for proposals could be distributed in a timely and targeted manner.

The industry urges OMAFRA to extend a similar Special Research Fund for 1999/2000, including alternative livestock, so industry research funds totaling $150,000 can be leveraged by government dollars.

Greg Fries presented an overview of the mink-farming sector, while Mike Bollert later submitted a state of the fox-farming sector.

Ted Parkinson, Chair of CMBA Research Committee, shared the ongoing and approved CMBA research related items:

⇒ Strategies for Isolation of a Mink Corona Virus in Cell Culture, Linda Saif, Ohio State University - $15,000;

⇒ Hormone Receptor Sites in Mink Skin, Dr. Jack Rose, Idaho State University - $8,800;

⇒ Alternative Feed Ingredients for the Mink Industry, Kirsti Rouvinen-Watt, Nova Scotia Agricultural College - $10,000 over 2 years;

⇒ Foot Pad Dermatitis In Farmed Mink In Canada, Bruce Hunter, Ontario Veterinary College, University of Guelph - $38,000 over 2 years - now completed;

⇒ Funding for Fur Chair Position, Nova Scotia Agricultural College - $75,000 over 5 years. This position was previously fully funded by the Nova Scotia Department of Agriculture and Marketing (NSDAM). Starting in 1998, the NSDAM committed $35,000/year for 5 years & Nova Scotia Mink Breeders has secured $50,000 towards the first 3 years;

⇒ Canada Mink Breeders Association presented the 19998-99 Arlen Kerr Memorial Scholarship of $2,000 to Sonja Brault, McGill University who is investigating the reproductive viability of male mink before breeding season. As of October 6, 1999 there has been no applications for the 1999-2000 scholarship.

CMBA funding for research will not likely be allocated until early in 2000.

The sub-committee also reviewed the following research related items:

- Appendix III – Summary of Fur-Bearing Research Included in the Inventory of Canadian Agricultural Research (ICAR) System;
- Appendix IV - On-going Fur Farm Projects - Nova Scotia Agricultural College;
- Appendix V – Research Projects Funded by the Mink Farmers Research Foundation, Fur Commission USA in 1998-1999;
- Appendix V - Mink Farmers Research Foundation Research Priorities for 1999-2000;
- Appendix VII – Mink Farmers Research Foundation Approved Funding for 1999-2000;
- Research from Danish Institute of Agricultural Sciences;
- Research from Michigan State University; and
- Recent copies of the Scientifur Journal – Scientific Information for Fur Bearing Production.

MISSION OR MANDATE

The main objective of fur-bearing research and services sub-committee is to review current and completed research in Ontario and other jurisdictions, and to subsequently identify and prioritize industry research and service needs. These priorities are be used to allocate and distribute public research funds made available to the fur farming industry. The sub-committee's mandate also includes identifying emerging issues facing the industry and drafting a state of the fur farming industry report.

INDUSTRY /SECTOR SCAN

State of the Industry Report

With the repeal of the Fur Farms Act in 1997, OMAFRA no longer compiles fur farm statistics. The compilation of fur farm statistics is now the responsibility of Statistics Canada. The Statistics Canada data encompasses only farmed mink and fox and does not include the total number of fur farms including other species (i.e. – lynx, chinchilla), nor does the data account for farms that raise multiple species (i.e. - a farm raising both mink and fox is considered two separate farms).

OMAFRA estimates there is a total of 80 fur farms in Ontario in 1999, about 11% less than in 1998 and 75% less farms than there were in 1989.

Table 1 - Number of Ontario Fur Farms for all Species Except Chinchilla - OMAFRA (* - estimated figure)

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
# Farms	315250		202	171	143	128	122	111	95	90*	80*

Mink

The mink farming industry went through 5 straight years from 1988 to 1993, where pelt prices were at, or below the cost of production, estimated at $30/pelt. The depressed markets and subsequent pelt prices are the key reasons, why there are 68% fewer mink farms in 1999 (63), than there were ten years ago in 1989 (199) – Table 2. In 1998, Ontario produced 37.3% of the 765,000 Canadian mink pelts that were marketed by the North American Fur Auctions (NAFA), followed by Nova Scotia (25.3%), British Columbia (17.5%) and Quebec (6.3%). Statistics Canada overall figures (including pelts marketed outside of NAFA) show that Nova Scotia produced 33.5% (326,800), Ontario 29.6% (288,700), British Columbia 20% (195,000) and Quebec 5.2% (50,800) of the Canadian production of 976,400 pelts. Ontario farmed mink raised in 1998, accounted for $9.5 million in farm gate sales.

Table 2 - Ontario Mink Production Statistics – Statistics Canada (* - estimated figures)

Year	# Mink Farms	Total # Female Breeders	Average Farm Size (# females)	Total # Mink Born	# Mink Born Per Female	Total # Mink Pelted	# Mink Pelted Per Female	Average Pelt Price	Farm Gate Revenue (millions)
1989	199	159,080	799	640,084	4.0	674,355	4.2	$16.77	$11.3
1990	153	105,448	689	379,370	3.6	369,978	3.5	$25.93	$9.6
1991	127	93,517	736	371,555	4.0	351,863	3.8	$23.36	$8.2
1992	109	92,047	837	385,022	4.2	384,604	3.2	$20.62	$7.9
1993	99	76,902	801	313,519	4.2	298,517	3.9	$37.62	$11.2
1994	86	76,915	874	327,781	4.3	315,589	4.1	$31.97	$10.1
1995	84	75,490	899	327,600	4.3	315,693	4.2	$65.00	$20.5
1996	76	74,560	981	336,000	4.5	319,000	4.3	$46.65	$14.9
1997	70	77,840	1,110	330,100	4.2	322,300	4.1	$43.02	$13.9
1998	67	79,000	1,180	316,000	4.0	288,700	3.7	$32.92	$9.5
1999	63	63,760	1,012	268,000	4.2*	255,000	4.0*	Not Sold	Not Sold
1999/98	94.0%	80.1%	85.8%	85%*	105%*	88%*	108%*	N.A.	N.A.

The average price received in 1998 (1997 pelt crop) was $32.92, some 24% less than the 1997 mink pelt crop, which averaged $43.03. At $33/pelt mink farmers are just meeting their costs and this may partially explain a 19% drop in the number of breeders kept in Ontario in 1999 compared to 1998, as reported by Statistics Canada.

Table 3 shows the average pelt prices paid for various pelt types (colours) ranged from $17 for pearl mink to $38 for Blue Iris; however 87% of the Ontario pelt crop is comprised of mahogany ($34.06), black ($28.09) and demi/wild ($29.28). It is also interesting to note that overall male pelt prices were 24.3% higher than females. Again in 1998/99 the biggest buyers of mink pelts sold by North American Fur Auctions (NAFA) were China/Hong Kong, Korea and Russia. Korea was an especially strong buyer of North American mink, while Russia preferred longer furred type mink from Scandinavia.

Table 3 – Average Pelt Price Prices for 1998 Pelt Crop Marketed by North American Fur Sales – By Pelt Type

Pelt Type	% of Total Pelt Crop Marketed by NAFA	Average Pelt Price (Canadian $)	Average Female Pelt Price (Canadian $)	Average Male Pelt Price (Canadian $)
Blue Iris	1.3%	$38.16	$32.65	$43.66
MKR Ranch Wild	1.3%	$34.93	$31.67	$38.18
Mahogany	54.1%	$34.06	$30.83	$37.28
Demi/Wild Mink	12.6%	$29.28	$24.58	$33.97
Black	20.2%	$28.09	$29.84	$36.24
Misc. Mutations	0.1%	$21.58	$16.28	$26.87
Pastel	6.6%	$27.92	$25.22	$30.62
Pearl	0%	$17.07	$16.15	$17.98
Sapphire	1.9%	$34.02	$30.65	$37.38
Silverblue	0.2%	$24.85	$19.18	$30.51
Violet	0.3%	$32.72	$29.07	$36.37
White	1.2%	$31.82	$25.36	$38.27
Aleutian	0.1%	$21.09	$19.78	$22.40
Total	100%	$32.92	$29.36	$36.48

Over the last few years the strong U.S. economy has really benefited Ontario mink farmers since the Canadian mink crop is sold in U.S dollars. As a result most Canadian mink farmers seem to be weathering the depressed pelt prices reasonably well; however, the U.S. mink ranchers face inevitable pelt outs unless prices improve 30-50%.

The outlook for the 1999/2000 marketing season looks a little brighter with each international sale showing more strength and higher clearances than previous sales. Recent auctions have shown some improvement with increases of about 30% for low grade and regular goods. Hopefully this will encourage and enable most ranchers to stay in business. Mink garment inventories are drying up, leaving most vendors scrambling to obtain enough pelts to hold them over until the new marketing season arrives. The upcoming year looks much healthier in terms of market conditions and rancher outlooks will also be much better with higher prices and good clearances.

Despite the strong demand from the pet food industry, most feed ingredients are abundant and readily available, including chicken, turkey and cheese by-products. Protein feeds are also available, but demand premium prices for most products, due to competition from the pet food sector.

Fox Farming

The 1999 selling season (1998 pelt crop) for ranched fox did nothing but assure another wave of pelt-outs in the Canadian fox industry. The market was disastrous - plain and simple. Again there were very poor clearances resulting in cash flow problems and overall the pelts that did sell, did not even come close to covering the cost of production. At the time of this report, not enough fox pelts had been sold to establish representative pelt prices. This was the tenth consecutive year, in which the average pelt price has been below the cost of production, which is estimated at $90-100. Unless there is a complete turn around in the prices paid for the North American ranch fox in 1999/2000, the few remaining producers in the fox sector will almost certainly pelt out.

The ongoing depressed prices has had the expected effect on the Ontario fox farming sector, as Table 4 shows the number of farms dropped 16% (from 31 in 1998 to 25 in 1999) and the number of breeders kept in 1999 (773) was 35% lower than in 1998 (1,180). The average herd size increased slightly from 38 vixens in 1998 to 40 in 1999. Ontario produced 8.9% (2,350) of the total Canadian 1998 fox pelt crop (26,510), ranking 6th overall behind Nova Scotia (21.1% or 5,590 pelts), Newfoundland (16.0% or 4,250 pelts), Quebec (17.8% or 4,710 pelts), New Brunswick
(13.0% or 3,450 pelts) and Prince Edward Island (10.1% or 2,690 pelts).

Table 4 - Ontario Fox Production Statistics (* - estimated figures)

Year	# Fox Farms	Total # Female Breeders	Average Farm Size (# females)	Total # Fox Born	# Fox Born/ Female	Total # Fox Pelted	# Fox Pelted/F emale	Average Pelt Price	Farm Gate Revenue (000's)
1989	145	5,633	39	10,564	1.9	11,230	2.0	$34.51	$387.9
1990	119	3,735	32	6,243	1.7	6,741	1.8	$32.75	$220.8
1991	87	2,227	26	3,876	1.7	3,616	1.6	$44.83	$162.1
1992	74	2,176	29	3,766	1.7	4,038	1.9	$31.30	$126.4
1993	57	1,719	30	2,879	1.7	2,910	1.7	$83.85	$244.0
1994	50	1,560	31	2,633	1.7	2,406	1.5	$72.00	$173.2
1995	47	1,605	34	2,427	1.5	2,316	1.4	$68.00	$157.5
1996	43	1,388	32	2,290	1.7	2,090	1.5	$83.53	$174.6
1997	32	1,403	45	2,500	1.8	2,430	1.7	$87.42	$212.4
1998	31	1,180	38	1,980	1.7	2,350	2.0	Not Sold	Not Sold
1999	26	773	40	1,300*	1.7*	1,200*	1.6*	Not Sold	Not Sold
1999/98	84 %	66 %	105 %	66%*	100%*	51%*	80%*	NA	NA

Chinchilla

Table 5 summarizes auction results reported by North American Fur Auctions in Rexdale. There is currently no reliable means of estimating the number of Ontario chinchilla that is marketed through private fur brokers. The National Chinchilla Breeders Association was asked for a state of the industry report, but the report had not been received at the time this report was submitted. The cost of production (excluding labour) is estimated at $20/pelt.

Table 5 - Chinchilla Sale Results Reported by North American Fur Auctions

Year	# Chinchilla Pelts Sold By Auction	Average Chinchilla Pelt Price
1995/96	14,673	$56.00
1996/97	10,356	$57.35
1997/98	2,316	$51.28
1998/99	2,525	$44.60

Emerging Issues

1. **Need for OMAFRA Special Research Fund** - For over ten years the fur-bearing sub-committee has met to develop research priorities under the OASCC system. During this time **no** OMAFRA funds were designated for fur farm related research. Currently the University of Guelph Animal Program does not encompass non-traditional livestock species such as mink, fox, deer and goats, all of which have a sub-committee under the OASCC system. As a result these species are not eligible for funding under the OMAFRA/UofG Contract. **The fur farm industry urges OMAFRA to extend a similar "Special Research Fund" for 1999/2000, including alternative livestock, so industry research funds can be leveraged by government dollars.**

   The Canada Mink Breeders Association (CMBA), the national marketing agency for Canadian mink farmers, has deducted 5 cents/pelt for research since 1997/98. Prior to 1998/99, the research deduction was collected only on Canadian pelts marketed by North American Fur Auction (NAFA) and did not apply to Canadian pelts marketed through Seattle Fur Exchange (SFE). CMBA and NAFA now have an agreement with SFE to allow automatic research deduction for all Canadian pelts shipped to Seattle. CMBA research budget is estimated at $54,700 comprised of $38,200 (764,000 pelts @ 5 cents/pelt) from pelts marketed by NAFA & $16,600 (332,000 pelts @ 5 cents/pelt) from pelts marketed by SFE. For a relatively small industry, a financial commitment of almost $55,000/year shows the Canadian fur farm industry recognizes the importance of research. The fur industry is very interested in pursuing cost-shared research.

   It is also important to emphasize the recent cooperative efforts of CMBA and the Mink Farmers Research Foundation (MFRF), a Committee of Fur Commission USA. The two groups attend each other's meetings, exchange details of projects being funded and consider joint funding of mutually beneficial projects (i.e. – research on Corona Virus at Ohio State). This communication and exchange of information reduces the likelihood of funding duplicate or already existing research. The MFRF provided $64,500 U.S. and $75,000 U.S. to research in 1999/2000 and 1998/1999 respectively.

2. **Expansion & Upgrade of Nova Scotia Agricultural College (NSAC) Fur Unit Facilities** – NSAC has the only on-site fur farm experimental facilities in Canada. A research infrastructure development grant was awarded to the NSAC Fur Unit Research Program by the Canada Foundation for Innovation. This grant will be used to expand and upgrade the existing NSAC Fur Unit facilities over the next five years. The project plan includes building a multi-row mink management facility for 400 females and 100 males with automated watering and mechanized manure removal, conversion of the feed kitchen to a wet by-product based feeding system, and implementation of an integrated animal and nest box identification and data collection system. A pelting and pelt processing facility will also be installed. This development is also supported by the Canada

Foundation for Innovation (40%), Nova Scotia Council for Higher Education (40%) and the Nova Scotia Mink Breeders Association (20%).

During 1998-99 the NSAC Fur Animal Research Programme has been active in the following areas:

- Feed quality evaluation;
- Digestive Physiology of mink;
- Mink manure management;
- Fox behaviour and reproductive performance;
- Testing of alternative feed ingredients and feed stuff preservation;
- Fur quality; and
- DNA fingerprinting to study inbreeding depression.

3. **Depressed Markets and Cash Flow Difficulties - Advanced Payments Program** - The fact that 1998/99 pelt prices were at or below the total cost of production is a major concern to remaining fur farmers. The Canada Mink Breeders Association (CMBA) has submitted a preliminary application to the Agriculture Canada requesting mink pelts be included as a commodity, under the Advanced Payments Program of the Agricultural Marketing Programs Act for the 1999/2000 selling season. A cash advance of yet to-be-determined % of expected average farm gate pelt price, at or after harvest, would allow producers to store the pelt crop and sell it throughout the year to potentially achieve higher returns from later sales. The producer organization (CMBA) would be responsible for ensuring that the cash advance is repaid as the crop is sold.

4. **Livestock Medicines Courses** - This is an initiative to enhance the already high quality standards of Ontario food and food products derived from livestock. Many of the Ontario livestock commodity organizations support voluntary producer certification, through commodity specific "Livestock Medicines Courses". Producers would need to be certified by 2003 in order to maintain access to over-the-counter livestock medicines. Non-certified producers would have to purchase livestock medicines from their veterinarian.

   The Ontario Fur Breeders Association supports this food quality assurance but expresses concern that this certification process should not encompass non-food producing sectors such as the fur farm industry.

5. **Environmental Issues** - Unlike the swine industry, the fur farming industry has not had high media profile regarding nutrient management and siting/zoning issues (establishing new operations or expanding existing ones). However the fur farming industry is aware and concerned with the regulatory and non-regulatory implications that may arise regarding zoning, manure management and dead animal disposal.

RESPONSE TO 1998 RECOMMENDATIONS

At the time the meeting, the sub-committee had only received responses from only ARIO and OMAFRA as listed below:

Response from ARIO to Priority Areas 1) Improved Health; 2) Opportunity Feeds

The ARIO accepts the above as the 1998 research priorities of the fur-bearing subcommittee. The ARIO also acknowledges the participation of the Fur-bearing subcommittee in the OASCC process. It is noted that changes in priorities have occurred over the 1997 listing. The ARIO supports the various minor species industries. A Special Research Fund to be administered by OMAFRA was introduced this year with one of 4 research areas being designated for alternative livestock. A proposal was received from the mink industry but it did not meet the Fund's eligibility criteria. In the event of additional calls for proposals, it is imperative that a current listing of research priorities be maintained in order to guide development in the fur-bearing sector.

Response from OMAFRA – Agriculture & Rural Division to Diagnostic and Aleutian Disease Serology Laboratories

1. Diagnostic services available to fur farmers continue at their recent level of two diagnostic pathologists backed up by full-service lab testing. Dr. Marina Brash left the University of Guelph's employ last fall and was replaced in May/99 by Dr. Shelley Newman, a board-certified pathologist who did her DVSc on mink diseases.
2. We continue to monitor and report on disease trends in fur-bearers and other species as part of our commitment to the Ontario Animal Health Surveillance Network.
3. AD testing continues to be provided through the Department of Pathobiology of the Ontario Veterinary College (OVC) (current fee - $0.70/test).
4. AD testing has not yet been transferred from the OVC to the Animal Health Laboratory, and no action has been taken on the certification program.

The sub-committee again expressed frustration and disappointment that the "Responses to the 1998 Recommendations" were not received from CARC, the Canada Committee on Animal Health and the Canada Committee on Animal Nutrition in time for the sub-committee meeting. As of October 12, 1999 the Chair still had not received responses. The sub-committee again stressed the need for more accountability and timeliness in providing the "Responses" and other feedback to the "species" sub-committees.

1999 RESEARCH & SERVICES RECOMMENDATIONS

RECOMMENDATION #1
TO ARIO, CANADA COMMITTEE ON ANIMAL HEALTH, CARC
CORONA VIRUS IN MINK

ISSUE

Corona virus is an infectious disease causing significant production and economic losses to most Ontario and Canadian mink farms. There is currently no specific treatment.

DETAILS

- To identify and develop strategies to isolate the Mink Corona Virus in cell culture and to subsequently develop control methods.

BACKGROUND

The Ontario fur industry (mink and fox production) competes in a tough international marketplace. The economic viability of fur farms is dependent upon solid, humane management practices and carefully planned health programs. Health management issues remain as research priorities in the mink and fox industries. Non-infectious disease conditions such as nursing sickness, mastitis, urolithiasis and early kit loss are being better controlled as farm management practices continue to improve; however infectious diseases such as Aleutian disease (AD) and corona virus enteritis continue to cause economic loss in the Ontario and Canadian mink industry. Corona virus is a problem on most Ontario mink farms.

Diarrhea in mink can be caused by viruses, bacteria, parasites and toxic substances. Just prior to weaning (4-6 weeks of age) mink kits begin to eat solid feed. Mink kits may develop a weaning diarrhea, consisting of grey/yellow droppings which often clings to the fur, causing what farmers call "sticky" or "wet" kits. The diarrhea is usually transient (short-lived) and causes low mortality. Diarrhea can also be a problem in adult and growing mink. Culture of the feces will show an assortment of bacterial organisms including E. coli, Staphylococcus intermedius, Proteus sp., Straptococcus sp. and Campylobacter jejuni. There has been a lack of research investigating viral causes of weaning diarrhea in mink. Reovirus, rotavirus and corona virus have been isolated from mink kit diarrhea, but their role in the cause of diarrhea is not known, as these agents may also be isolated from clinically normal kits. There is currently no specific treatment, although broad-spectrum antibiotics may help prevent secondary bacterial infections. Source - Mink...Biology, Health and Diseases, D.B. Hunter & N. Lemieux, 1996.

In 1998/99 the Canada Mink Breeders Association designated $15,000 towards research to develop strategies for the isolation of the Corona Virus in Cell Culture. The Mink Farmers Research Foundation, in the U.S. also committed $5,500 U.S. ($8,250 Cdn.) to this research in 1999/2000.

RECOMMENDATION #2
TO ARIO, CANADA COMMITTEE ON ANIMAL HEALTH, CARC
PREVALENCE AND ECONOMIC IMPACT OF ALEUTIAN DISEASE IN MINK

ISSUE

Aleutian Disease (AD) is an infectious disease causing significant production and economic losses to many Ontario, Canadian and North American mink farms. Extensive blood testing followed by culling the positive animals (test and slaughter) is the only means to control AD. There is a need for research to assess prevalence and economic impact of AD in the Ontario industry, coupled with development of a workable provincial certification program to identify AD clean farms as a source of healthy breeding stock.

DETAILS

- To investigate overall prevalence of Aleutian Disease on Ontario mink farms;
- To assess the production related losses associated with AD;
- To evaluate the economic impact of Aleutian disease on the Ontario mink industry; and
- To develop a provincial certification program for AD clean farms.

BACKGROUND

The Ontario mink farming industry competes in a tough international marketplace. The economic viability of fur farms is dependent upon solid, humane management practices and carefully planned health programs. Health management issues remain as research priorities in the mink and fox industries. Non-infectious disease conditions such as nursing sickness, mastitis, urolithiasis and early kit loss are being better controlled as farm management practices continue to improve; however infectious diseases such as Aleutian disease (AD) and corona virus enteritis continue to cause economic loss in the Ontario and Canadian mink industry.

Aleutian Disease of mink is a viral (Parvovirus) induced infection transmitted from infected breeding stock to their progeny. The disease can result in poor production, increased mortality and reproductive losses, and a generalised immunosuppression in the mink. AD is likely the single most important disease in the mink industry and can only be controlled by extensive blood testing followed by removal of positive animals (test and slaughter). There is a need for research to assess prevalence and economic impact of AD in the Ontario industry, coupled with development of a workable provincial certification program to identify AD clean farms as a source of healthy breeding stock for domestic and export markets.

RECOMMENDATION #3
TO ARIO, CANADA COMMITTEE ON ANIMAL NUTRITION & CARC
AN EVALUATION OF THE AVAILABILITY, ACCESSIBILITY AND COST OF "OPPORTUNITY FEEDS" FOR FUR FARMERS.

ISSUE

The fur farming sector is constantly struggling to secure a reliable and affordable supply of traditional meat by-products to use as feed ingredients, due to ongoing competition with the pet food industry. When the supply of traditional meat by-products runs short and prices increase, the fur farm sector cannot compete with prices paid by the pet food sector. As a result the industry must be prepared to consider the use non-traditional opportunity feeds. There is a need to assess potential opportunity feeds to ensure quality assurance from a nutritional and feed safety perspective.

PRIORITIES

- To prepare an inventory of potential "opportunity feed" sources, taking into consideration the amounts produced, predicted continuity of supply, actual cost, if any, and costs associated with transportation, storage and handling.
- To assess the potential quality of such feeds based initially on an evaluation of possible deleterious components, disease hazards and variations in composition and consequently feeding value.
- In the event that suitable "opportunity feeds" are identified through the above processes, to carry out appropriate nutritional evaluation by means of chemical analyses and feeding trials to determine acceptable levels of inclusion for different life stages.
- To investigate the cause of foot pad necrosis syndrome in mink and determine if there is a relationship between the disease and the feeding of seal meat. If a relationship is found, the research

would determine appropriate methods of feed handling and treatment, as well as identify appropriate rates of inclusion, so the product could be utilized as a feed source by the fur industry.

BACKGROUND

Ensuring a supply of high quality and affordable feed continues to be a priority for the fur industry. Since feed represents the largest cost in raising mink, farmers are continually seeking cheaper ingredients in order to reduce their operating costs. Although the nutritional quality of these "opportunity feeds" is important and clearly influences their usefulness and potential level of inclusion in a mixed ration, it is inappropriate to spend time and money evaluating them when their accessibility and continuity of supply is uncertain.

A number of food processing industries, such as abattoirs and rendering plants, generate potentially useful feed ingredients. These industries themselves are changing with the consolidation and integration of food production and associated waste disposal. Any research into the nutritional value of feeds from these sources should be preceded by an assessment of their availability and cost to the farmer.

It should be noted that opportunity feeds vary from region to region and more so from province to province. Thus what is seen as an opportunity feed in Eastern Canada (i.e. - herring, hake, seal meat), may or may not be a viable option for Ontario. Thus time and effort need to be allocated to identify and evaluate opportunity feeds, that could be utilized by the Ontario fur farming sector.

There were 250,000 seals killed off the East Coast of Canada in 1998. The Newfoundland government provides incentives to sealers to bring carcasses to shore, but apparently most carcasses are left behind. The fur farm industry competes directly with the pet food industry for most meat by-products; however in most instances the fur farm sector is unable compete on a price basis. The pet food industry is not seen to be interested in seal meat as a feed ingredient, primarily for public relations reasons. The availability of alternative feed sources such as seal meat provides an appealing option for the industry, but the nutritional quality and safety of these feed sources often have not been well studied. Recently the feeding of seal meat has been suspected to cause a disease in mink characterized by lesions on the feet and nose pads (food pad necrosis syndrome). The cause of this condition, its association (if any) with the feeding of seal meat and methods of feed treatment or feed processing that would allow this product to be useful for the fur industry have high priority. Research funded by the Canada Mink Breeders Association attempted to isolate an infectious agent and describe the epidemiology of the disease. At the present time no causative agent has been identified. The concern associated with the seal meat is an objective lesson in the care which must be taken when any novel feed sources are being screened for their potential use in fur farmed animals.

RESEARCH RECOMMENDATION #4
TO ARIO, CANADA COMMITTEE ON ANIMAL HEALTH, CARC
FOOT PAD NECROSIS IN MINK

ISSUE

The Canadian east-coast seal industry is looking for a market for its meat by-products and the fur farming industry is looking for reliable and affordable alternative feed ingredients. What appears to be

an excellent opportunity to use this otherwise waste by-product may be jeopardized due to concerns that the feeding of seal meat **may be** linked to a disease in mink characterized by lesions on the feet and nose pads (food pad necrosis syndrome). Identifying the cause of this condition, its association or non-association with the feeding of seal meat and possible methods of feed treatment or feed processing that would allow this product to be safely fed to mink, would greatly benefit both the sealing and fur farming sector.

PRIORITIES

- to investigate the cause of food pad necrosis syndrome in mink;
- determine if there is a relationship between the disease and the feeding of seal meat;
- determine appropriate methods of feed treatment that would allow the product to be utilized as a feed source by the fur farming industry.

BACKGROUND

A shortage of high quality and affordable feed continues to be a priority for the fur industry. The availability of alternative feed sources such as east coast seal meat provide an appealing option for the industry, but the nutritional quality and safety of these feed sources often have not been well studied. Recently the feeding of seal meat has been suspected to cause a disease in mink characterized by lesions on the feet and nose pads (food pad necrosis syndrome).

The Canada Mink Breeders Association funded research ($38,000) to attempt to isolate an infectious agent and describe the epidemiology of the disease. Initial research on foot pad necrosis in mink provided a wealth of epidemiological data, and although there was a "loose" relationship between the disease and the feeding of seal meat, no causative agent was identified. Further research is needed to investigate the cause of food pad necrosis syndrome in mink and determine if there is a relationship between the disease and the feeding of seal meat. If a relationship is found, the research would determine appropriate methods of feed treatment that would allow the product to be utilized as a feed source by the fur industry.

NON-RESEARCH RECOMMENDATIONS

RECOMMENDATION #1
TO ANIMAL HEALTH LABORATORIES, LABORATORY SERVICES & OVC, U OF G & OMAFRA
DIAGNOSTIC AND ALEUTIAN DISEASE SEROLOGY LABORATORIES AND SERVICES

PRIORITIES

- To continue to provide diagnostic and case related consultative services to fur farmers and veterinarians;
- To monitor disease trends;
- To continue to provide blood testing at a price which encourages mink farmers to work towards controlling or eradicating Aleutian Disease (A.D.); and

- To develop a AD certification program with the Ontario Veterinary College/Animal Health Laboratories of the University of Guelph providing technical testing or limited technical assistance.

BACKGROUND

The Animal Health Laboratories, University of Guelph provides complete diagnostic services at its laboratories. The fur farming sectors use of these services has declined significantly over the last few years, which reflects the economic state of the industry. Some farmers have chosen to reduce or eliminate preventative vaccination and diagnostic programs thus risking a ranch outbreak of highly infectious diseases and increased mortality. A more pressing concern is the safety of the producer in the case of an outbreak of a zoonotic disease such as rabies.

The Ontario Veterinary College tests blood samples using the counter-immune electrophoresis (CEP) test for a fee of $0.70/sample. The test results are summarized annually by OMAFRA and the summary presented to the Ontario Fur Breeders Association.

Aleutian Disease of mink is a viral induced infection transmitted from infected breeding stock to their progeny. The disease can result in poor production, increased mortality and a generalised immunosuppression in the farm. The continuation of the diagnostic services and Aleutian Disease (A.D.) serology program is essential to the Ontario fur farming industry.

APPENDIX I - 1999 FUR BEARING RESEARCH AND SERVICES SUB-COMMITTEE

Name	Points of Contact	Organization Represented	Term
Dr. Jim Atkinson	Dept. of Animal & Poultry Science, niversity of Guelph, Guelph, Ontario N1G 2W1 (519)824-4120 ext. 3716 Fax (519)836-9873 email - jatkinson@aps.uoguelph.ca	University of Guelph	2002
Michael Bollert	Mailing address, etc. not provided at request of member, for security reasons.	Ontario Fox Committee	2001
Dr. Shelley Newman	Animal Health Laboratory, Laboratory Services Division, University of Guelph Guelph, Ontario N1G 2W1 (519)824-4120 ext. 4550 Fax (519)821-8072 email - snewman@lsd.uoguelph.ca	University of Guelph	2003
Dr. Ian Duncan	Dept. of Animal & Poultry Science, University of Guelph, Guelph, Ontario N1G 2W1 (519)824-4120 ext. 3652 Fax (519)836-9873 email - iduncan@aps.uoguelph.ca	University of Guelph	2002
Greg Fries	Mailing address, etc. not provided at request of member, for security reasons.	Ontario Fur Breeders Association	2001
Katherine Hoffman	Education, Laboratory and Research Division, 1 Stone Road W., Guelph, Ontario N1G 1B6 (519)826-4183 Fax (519)826- Email - khoffman@omafra.gov.on.ca	Ontario Ministry of Agriculture, Food and Rural Affairs	2003
Dr. Bruce Hunter	Department of Pathology, Ontario Veterinary College, University of Guelph, Guelph, Ontario N1G 2W1 (519)824-4120 ext. 4625 Fax (519)824-5930 email - bhunter@ovcnet.uoguelph.ca	University of Guelph	2001
Ted Parkinson	Mailing address, etc. not provided at request of member, for security reasons.	Ontario Fur Breeders Association	2002
Gary Richardson	Finnie Distributing Inc., Mailing address, etc. not provided at request of member, for security reasons.	Feed Industry	2003
Tom Riedstra	Mailing address, etc. not provided at request of member, for security reasons.	National Chinchilla Breeders of Canada	2003
Brian Tapscott, Chair	Wellington Place R.R. #1 Fergus, Ontario N1M 2W3 (519)846-0941 (519)846-8178 email - btapscot@omafra.gov.on.ca	Ontario Ministry of Agriculture, Food and Rural Affairs	2001

APPENDIX II - TERMS OF REFERENCE - FUR-BEARING RESEARCH AND SERVICES SUB-COMMITTEE

1. To review fur-bearing research and services being carried out in Ontario and other jurisdictions.
2. To identify potential new areas of research and services.
3. To recommend in order of priority, which existing or new areas of research or services, should be supported.
4. To assemble a state of the fur farming industry report.
5. To identify emerging issues facing the fur farming industry.
6. To submit reports and make presentations to the Ontario Animal Research and Services Committee, encompassing the sub-committee's recommendations and findings.
7. To invite researchers in Ontario to information meetings where progress in research and services with fur-bearing animals can be presented.
8. To ensure liaison and communication among agencies or groups which have a primary interest in the Ontario fur farming industry.
9. To function through a sub-committee chairperson, appointed by the Ontario Animal Research and Services Committee. The appointment of the chairperson will be for four years. The chairperson will not succeed him/herself.

APPENDIX III - SUMMARY OF FUR-BEARING RESEARCH INCLUDED IN THE INVENTORY OF CANADIAN AGRICULTURAL RESEARCH (ICAR) SYSTEM

- Delaying Priming in Black Mink, K. Rouvinen-Watt, Nova Scotia Agricultural College;
- Development of Methods to Assess Fertility in the Male Fox, L. MacLaren, Nova Scotia Agricultural College;
- Dietary Manipulations to Prevent Nursing Sickness in Mink, K. Rouvinen-Watt, Nova Scotia Agricultural College;
- Effects of Inbreeding on Reproductive Characteristics of Male Mink, L. MacLaren, Nova Scotia Agricultural College;
- Factors Affecting Prenatal Pup Mortality in Silver Fox, K. Rouvinen-Watt, Nova Scotia Agricultural College;
- Fox Behaviour, T. Tennessen, Nova Scotia Agricultural College;
- Fur Bearing Animal Feeding Research, Shur-Gain;
- Nutritional and Hygienic Quality of Mink Diets During Gestation and Lactation in relation to Female Reproductive Performance in Nova Scotia, K. Rouvinen-Watt, Nova Scotia Agricultural College;
- Preservation and Testing of Poultry and Fish By-Product Feedstuffs for Mink, K. Rouvinen-Watt, Nova Scotia Agricultural College.

APPENDIX IV – ON-GOING FUR FARM PROJECTS - NOVA SCOTIA AGRICULTURAL COLLEGE

- Alternative feed Ingredients for the Mink Industry, K. I. Rouvinen-Watt, M. White & M. Johnson;

- Preservation and Testing of Poultry and Fish By-Product Feedstuffs for Mink, K. Rouvinen-Watt, Nova Scotia Agricultural College;
- Amino Acid Content and Apparent Digestibility of Ground Whole and Acid Ensiled Spent Hens, M.B. White, K. I. Rouvinen-Watt & M. Hartling;
- Effects of Inbreeding on Reproductive Performance in Mink, A.H. Farid & L. MacLaren;
- Effects of Inbreeding on Reproductive Characteristics of Male Mink, L. A.H. Farid & L. MacLaren;
- Development of Methods to Assess Fertility in the Male Fox, L. MacLaren, Nova Scotia Agricultural College; and
- Breeding Management of Pine Marten, K.I. Rouvinen-Watt, D.L. Patterson, M. Rankin & J. Grant.

APPENDIX V – RESEARCH PROJECTS FUNDED BY THE MINK FARMERS RESEARCH FOUNDATION, FUR COMMISION USA, IN 1998/99

- To Identify Proteins Responsible for Pathogenicity of the Aleutian Disease virus, Marshall Bloom, Rocky Mountain Labs;
- Development of Aleutian Disease Vaccine - Specifically on Receptor Sites at the Cellular Feed Preservative Studies and Trials, Dr. Gary Durrant
- Study with Stabisil, as a feed preservative showed the product was ineffective & feed products rotted, rather than ensiled, Dr. Gary Durrant. As a result, Stabisil has been removed from the U.S. market.
- Enzymatic Digestion of Feed Ingredients for Mink, Dr. Gary Durrant
- Effects of Zinc Supplementation as a means of Stimulating Mink's Immuno Responses, Dr. Dale Barnard, Utah State University;
- Development of a Test to Identify which types of E-Coli are/are not Pathogenic to Reduce Losses from E-Coli, Dr. Neil Dyar, North Dakota State University;
- Developing Behavioral Tests for Neonatal and Growing Mink, Dr. Richard J. Aulerich, Michigan State University;
- Ergot Tolerance in Growing Mink, Dr. Richard J. Aulerich, Michigan State University – Ergot could be tolerated up to 25 ppm in the diet of growing mink. Will be investigating impact on reproduction.
- Compilation of "Handbook of Biological Data for Mink", Dr. Richard J. Aulerich, Michigan State University;
- Role of Glucocorticoids and endogenous opioids in stress in mink; Dr. Richard J. Aulerich, Michigan State University;
- Impact of Various Strains of C. perfringens on Mink, Dr. John Gorham, Washington State University
- Tyrosinemia in Mink – Isolation of Controlling Gene for this Disorder, Dr. John Gorham, Washington State University. Research terminated.
- Understanding Fur Growth Cycle in Order to Manipulate it to Produce Denser, Higher-Quality Pelts, Dr. Jack Rose, Idaho State University.

APPENDIX VI – MINK FARMERS RESEARCH FOUNDATION RESEARCH PRIORITIES FOR 1999-2000

Priority	Area of Research		
	Disease	**Feeds/Nutrition**	**Physiology/Management**
I	• Viral Disease (Aleutian Disease & Distemper) – Identify new virus strains & develop means of control. • Enteritis/Septicemia – Identify & isolate bacterial & viral strains and develop control methods.	• Alternate Feeds – Identify & analyze potential feeds for mink, including spent hens. Compile table of nutrient values. • Feed Processing – Investigate methods of preserving fresh feeds, including acidification, ensiling, and use of preservatives (Cu, formaldehyde)	• Early Kit Losses – Identify causes and prevention of losses of neo-natal kits. Investigate lactobacillus spray products as preventatives. • Environmental Problems – Investigate & develop practical cost-effective ways of disposing of mink farm wastes, including composting, and fly and odour control. Determine nutrient and fertilizer values for mink manure. Develop uses for manure.
II	• Blue Mink Problems – Investigate boils and pussy lungs. • Nursing Sickness – Investigate physiological basis for nursing sickness & study relationship to management practices.	• Nutrient Requirements – Assemble data on nutrient needs of mink at different staff of the life cycle. Combine these with data on feed nutrients in a form suitable for computer formulation of diets.	• Hormone Studies – Investigate effects of lighting on mink life process. Continue investigation of ways in which hormones influence basic processes of growth, reproduction, lactation, and fur production. Study possible involvement of melatonin in immunity with specific types of mink.
III		Food Poisons – Continue investigation of toxins that occur in, or contaminate, mink feeds. Feed Additives – Test usefulness of feed additives against problems (e.g. – electrolytes in times of heat stress, enzyme "cocktails", probiotics, and DL methionine as a means of preventing cannibalism	Housing – Develop recommendations on multiple caging of mink, consistent with the welfare of the animals. Investigate means of measuring stress in mink.

APPENDIX VII – MINK FARMERS RESEARCH FOUNDATION APPROVED FUNDING 1999-2000

Researcher and/or Topic	Amount Requested (US $)	Amount Approved (US $)
Aulerich, Michigan State University, Environmental Studies	$12,000	$13,500
Barnard, Utah State University	$13,700	$7,000
Bloom, Rocky Mountain Laboratory	$8,500	$8,500
Dyer, North Dakota State University, E. Coli protocol		$8,000
Gorham, Washington State University, Develop CD-Rom or Tape with Mink Disease Slides	$10,300	$10,000
Rose, Idaho State University	$13,700	$7,000
Saif, Ohio State University, Corona Virus		$5,500
Distemper Research – follow up on distemper vaccine trial		$5,000
Total		$64,500

APPENDIX VIII - SUMMARY OF DISTRIBUTION OF RECOMMENDATIONS

Recommendation	To Agency(ies)					
	AAFC	ARIO	CC	CARC	OMAFRA	Other
Research						
1. Corona Virus in Mink		X	Animal Health	X		
2. Prevalence and Economic Impact of Aleutian Disease in Mink		X	Animal Health	X		
3. An evaluation of the availability, accessibility and cost of "opportunity feeds" for fur farmers.		X	Nutrition	X		
4. Foot Pad Necrosis in Mink		X	Animal Health	X		
Services						
1. Diagnostic and Aleutian Disease Serology Laboratories and Services						OVC & Animal Health Laboratories Uof G

ONTARIO GOAT RESEARCH AND SERVICES COMMITTEE 1999

EXECUTIVE SUMMARY

The committee re-affirmed the importance of maintaining its activities even though there is no provincial funding specifically "ear-tagged" for goat research. With the industry showing dramatic growth in the past several years, particularly in the dairy sector, health and reproduction remain the major research priorities for 1999 – 2000. As in most animal industries, concerns over the financial abilities of the industry to address issues such as quality assurance programs and national identification are very real.

COMMITTEE ACTIVITIES

The committee met on June 2, 1999 to discuss the state of the industry, identify emerging needs and outstanding issues, and set research priorities. The chairmanship changed this year. The Committee recognized Dr. John Martin for his years of service. The Committee welcomed Caroll Thomas, representative for the Ontario Goat Milk Producers' Association, as a new member.

Members discussed the value of meeting as a committee, when OMAFRA does not recognize goats in their research contract with the University of Guelph. Some of the OMAFRA facilities could easily house goats (such as the Sheep ROP barn) with very little alterations. The committee stressed it is important to continue meeting with industry, research and government representatives to prioritize research and services needs, and issues that impact the industry.

STATE OF THE ONTARIO GOAT INDUSTRY

Expansion continues in the dairy goat industry with about 25 new producers beginning to ship milk in the past year. This represents an outstanding 26 percent annual growth! The majority of this growth occurred in south-central and south-western Ontario.

Stabilization in market prices for high quality meat kids has resulted in a considerable increase in the number of inquiries as to the viability of meat goat production as a secondary, or part-time enterprise. The South African Boer goat continues to expand its influence in Ontario herds, as producers strive to produce better-muscled and faster growing market kids.

A national committee has been struck to develop the Code of Practice for Goats, using a draft, submitted by producers in Alberta, as the template. The committee met in late June, with a second meeting planned for November. It is expected that the final version will be available to producers by mid 2000.

Dairy Sector

The goat milk industry is likely the fastest growing livestock industry in Ontario, showing an astonishing 26 percent growth in the past year. The total number of licensed producers shipping milk has increased from 95 to 121.

Requests for information on entering the industry remain steady from people changing enterprises (especially from dairy cattle), and those entering agriculture for the first time.

Estimates of production would suggest that about 6.5 million litres of fluid goat milk are being produced annually in the province. This is an increase of over 25 percent compared to last year's estimate of 5 million litres. Even with this increase in production, supply cannot fulfill the demand, as aggressive processors continue to expand their markets into other provinces and the United States.

Milk prices that producers received have shown a small increase in the past year. Hewitt's Dairies of Hagersville remain the largest buyers of raw milk in Ontario, collecting from approximately 102 producers. Four processors in Eastern Ontario are buying milk from about 20 producers.

The majority of goat milk is processed into cheeses, with less than one third being packaged as fluid milk. Currently, there are two processors who package fluid goat milk for sale. While many consumers drink milk for health reasons, such as food sensitivities in themselves and their children, others are attracted by goat milks natural image. It is important than this image not be compromised. Goat milk yogurt and ice cream are also produced commercially, but account for considerably smaller portions of the total amount of milk processed.

Producers continue to need reliable technical information, and help in formulating rations to get the best production from their goats, and developing a practical, cost effective system for raising the excess kids produced by dairy goats.

Artificial insemination and embryo transfer, are gaining more interest with producers for on-farm use to improve genetics, as well as for export market potential.

Meat Sector

During 1998 the market prices for meat animals has been depressed, but volume slaughtered in Ontario provincial plants virtually unchanged compared to 1997.

The use of the Boer buck as a terminal meat sire on the dairy breeds has produced a very marketable meat kid. There is a strong market demand for these type of meat kids, as well as Nubian and Nubian cross kids.

Slaughter of meat goats remains fairly seasonal, with major activity occurring for the Easter and Christmas ethnic markets. The data shown in the graph below only represents goats slaughtered in provincial plants in Ontario, but represents the majority of goats slaughtered.

The Ontario Goat Breeders' Association has spent a lot of time in the past several years, working towards a check-off system to finance its operations. At the moment the OGBA is a purely volunteer organization. Funds from the check-off would have enabled it to better support and develop the goat industry. However, at the present time, there does not appear to be the support needed within the industry to pursue the effort any further.

FIBRE SECTOR

As with all natural fibres, price for mohair remains low. Producers are not shipping fibre to the Canadian Cooperative Woolgrowers at Carlton Place, at the present time, as it is being stockpiled due to the low prices offered on the world market. Those producers who sell direct to mills or consumers, or have it processed and return to them for cottage industry production, are generating somewhat better returns. Typical prices for mohair through these latter avenue are:

Farm gate fleeces	kid	$10 - $15 per pound
	adult	$4 - $8 per pound dependent on quality

Processed ready to use $5 per 100 gm.

Mohair sweaters $75 to $450 at craft sales depending on pattern, hand or machine knitted etc.

INDUSTRY ORGANIZATIONS

Ontario's goat industry is represented by Ontario Goat Breeder's Association (OGBA) and the Ontario Goat Milk Producers' Association (OGMPA). Both are channeling their resources in promoting their industries: dairy, fibre and meat, on very small budgets and enormous volunteer efforts.

A list of their accomplishments in the past year follows:

OGBA

- completion of two(2) goat production manuals, in partnership with OATI
- one focused for novice & new producers
- the second provides a more in-depth approach to goat production
- production of ***The Goodness of Ontario Goats*** for Ontario Agri-Food Education, Inc.
- participating member of the Livestock Medicine Certification Program Committee
- numerous public promotion displays such as at the Western Fair

OGMPA

- production of 25 minute promotional video on goat milk industry and goat milk
- production of 5 minute "loop" video for public promotional projects
- production of booklet "So, You Want to Milk Goats?" containing extensive start-up information
- numerous public promotion display such as The Farm Show at Toronto
- member of committee working on the National Dairy Code

EMERGING NEEDS & ISSUES

1. ***Milk quality testing***

Although OMAFRA coordinated a six-month trial for goat milk quality testing last year, very few producer samples are now being submitted for testing. Those that are, arrive at the laboratory very sporadically. By law, OMAFRA is required to ensure that at least one milk sample from each farm is tested on a monthly basis. With today's emphasis on Quality Assurance, it is even more important that producers have samples tested, and timely reports on the results if they are expected to make any headway in improving their product, and markets.

2. ***HACCP and On-Farm Food Safety***

Producers are concerned that processing plants and abattoirs that service the goat industry will be negatively affected by the move to have HACCP programs implemented. Costly upgrades are often out of reach for many small and mid-sized operations. Producer organizations also recognize the importance of on-farm food safety programs in maintaining consumer confidence, but cannot afford to shoulder the cost of any such initiatives to ensure their industries comply and are not negatively impacted by any subsequent trade restrictions. Both organizations are funded through memberships and donations, and volunteer time; neither has a check-off for funding.

3. Reproductive Efficiencies

With the sudden death of Rob Ross in early 1999, the industry lost the use of a very important management service, that being pregnancy diagnosis. This service is extremely important in industries that must rely on out-of-season breeding to ensure a year round supply of milk to the

processors. It is understood that the Ontario Sheep Marketing Agency has renegotiated with the College of Veterinarians of Ontario to ensure that this service can be made available through other qualified and certified persons. The goat industry requests that this be a recognized and standard service, rather than a special dispensation from CVO.

4. ***Ensure Nutrient Management Plan Guidelines are used Judiciously***

Some municipal authorities are using the guideline's animal unit equivalent from the Nutrient Management Plan as "gospel" for the carrying capacity of a particular farm, instead of using these as the intended guide to the large operation. There appear to be discrepancies in the animal units used for each species relative to the Dry Matter Intake and the amount of manure produced by the particular species. This application is becoming a serious hindrance to the development of the goat industry and other industries in this province. By their application, municipalities are labeling all operations as "super" farm factories and treating them as so. **Animal units need to be reviewed and updated, so as to be representative of relative output of manure, and critical nutrients (ie. phosphorus) per unit bodyweight, rather than the current arbitrary system used.**

5. Predation

Predators continue to be a problem to producers. OMAFRAs' initiatives in the development of an integrated predator control programme for the province will assist producers to reduce predation, but they must be pursued to ensure that there will be aid to producer in the control of the problem animals. The integrated predator control programme must be considered complementary to the compensation programme, not its replacement. There will always be a need for some compensation, as the predator problem can never be eliminated.

6. Research Funding

The goat industry is one of the most rapidly expanding livestock industries in Ontario, boasting a 26 percent growth in the last year, alone. This expansion is based on solid market development and expansion from key industry players, yet the industry had no government funded research programs that other commodities enjoy and benefit from. It is imperative that funds be "earmarked" for research into some of the major limiting factors in health, reproduction, nutrition, genetics and management, if this viable and vibrant industry is to develop further into a mature industry.

RESPONSE TO 1998 RECOMMENDATIONS

Response
ARIO
Research Priority Areas (as directed to ARIO):
1) Health; 5) Reproduction

The ARIO accepts the above as the 1998 research priorities of the goat subcommittee. The ARIO supports the various minor species industries. A Special Research Fund to be administered by OMAFRA was introduced this year with one of 4 research areas being designated for alternate livestock. The goat sector did participate in this Fund but was unsuccessful in obtaining funding. In the event of additional calls for proposals, it is imperative that a current listing of research priorities be maintained in order to guide developments in the goat sector.

RECOMMENDATION #1 **PRIORITY 1B**
TO ARIO, U OF G

HEALTH

OBJECTIVES

1. Identify the major production limiting diseases, and develop methods of control and eradication.
2. Investigate the causes, control and prevention of neonatal diseases in kids.
3. Evaluate the results of research into common pathogens elsewhere in the world, and if applicable, apply the findings to the control of these diseases in the province.
4. Investigate the prevalence and significance in public health of zoonotic diseases.
5. Develop computer systems to assist herd health management and production

Response
ARIO: see response at top of section.

UNIVERSITY OF GUELPH: The recommendations above are not being addressed by the Animal Program at the University of Guelph in 99/00.

RECOMMENDATION # 2 **PRIORITY 1A**
TO AAFC, OMAFRA

GENETIC IMPROVEMENT

OBJECTIVES

1. To develop genetic improvement programs to measure in herd and across breed improvements
2. To compare the performance and productivity of the present breeds in Ontario.
3. To develop Expected Progeny Differences (EPD=s) economic traits.
4. To determine the heritability of important fibre traits.

Response
AAFC: The details of this recommendation are related to the Animal Industry Division of the Market and Industry Services Branch of Agriculture and Agri-Food Canada. It is noted that genetic improvement activities had been privatized.

UNIVERSITY OF GUELPH: The recommendations above are not being addressed by the Animal Program at the University of Guelph in 99/00.

RECOMMENDATION # 3 **PRIORITY 1A**
TO UNIVERSITY OF GUELPH. (PROF. CANT)
NUTRITIONAL STANDARDS FOR ONTARIO GOATS

OBJECTIVES

1. To develop a nutrition computer model for the growing kid and the breeding doe raised under Ontario conditions.

Response
UNIVERSITY OF GUELPH: The Animal Program is not addressing the recommendations above at the University of Guelph in 99/00.

RECOMMENDATION # 4 **PRIORITY 1A**
TO UNIVERSITY OF GUELPH, FOOD TECHNOLOGY
PRODUCT DEVELOPMENT & PRODUCT QUALITY

OBJECTIVES

1. To investigate genetic and management factors that can affect the consumer quality of milk and meat.
2. To evaluate the genetic components of economically important carcass traits and their value to the producer.

Response
UNIVERSITY OF GUELPH: The recommendations above are not being addressed by the Animal Program at the University of Guelph in 99/00.

RECOMMENDATION # 5 **PRIORITY 1A**
TO AAFC, ARIO, U OF G
REPRODUCTION

OBJECTIVES

1. Apply new reproductive technologies to goat breeding, including embryo transfer technologies, improved semen handling and storage, and the hormonal manipulation of the oestrus cycle
2. Investigate the causes of reduced reproduction performance at both the individual and herd level, the control of abortion and other failures.

Response
AAFC: It is noteworthy that an up to date Recommended Code of Practice for the Care and Handling of Goats is currently under development under the auspices of the Canada Committee on Animals, Canadian Agri-Food Research Council, with the participation of stakeholder organizations, including the Goat Subcommittee. A section of the code deals with reproduction.

UNIVERSITY OF GUELPH: The recommendations above are not being addressed by the Animal Program at the University of Guelph in 99/00.

RECOMMENDATION # 6 **PRIORITY 1A**
TO AAFC, OMAFRA, U OF G

MANAGEMENT

OBJECTIVES

1. To investigate management systems that will provide optimum production for the different segments of the Ontario herd.
2. Evaluate the output and economics of different production systems (e.g. intensive housing v. pasture grazing, accelerated v. once a year kidding etc.)
3. Evaluate different housing and management systems through all seasons for the raising of kids.

Response
AAFC: It is noteworthy that an up to date Recommended Code of Practice for the Care and Handling of Goats is currently under development under the auspices of the Canada Committee on Animals, Canadian Agri-Food Research Council, with the participation of stakeholder organizations, including the Goat Subcommittee. This Code will have sections dealing with management.

UNIVERSITY OF GUELPH: The recommendations above are not being addressed by the Animal Program at the University of Guelph in 99/00.

RESPONSE TO 1998 RECOMMENDATIONS

RECOMMENDATION # 1
TO OMAFRA

EXTENSION SUPPORT

Promotion of Best Management Practices for Goat Production, both for existing and new producers.

Response
***OMAFRA* – Agriculture & Rural Division** An information package containing recommendations on management practices is available from the Provincial Sheep and Goat Specialist. Development of a "Provincial" manual is under consideration.

RECOMMENDATION # 2
TO OMAFRA

MILK QUALITY

A "feedback" mechanism is required for milk quality to help producers. Support is needed for any private initiatives to identify product quality for the producer.

Response
***Omafra* – Food Inspection Branch** In 1998, A trial project involving OMAFRA, the Laboratory Services Division of the University of Guelph and producers was conducted to improve the number of raw goat milk samples arriving at the lab for quality testing. The project was successful and as a result, more producer samples are being tested on a routine basis. Subsequently, there are more producer results to report.

It was agreed that until additional resources become available to change the data handling computer program and automatically create producer result letters, that the lab would provide individual producer results to OMAFRA for distribution. The individual producer results are generated at month end and then sent out once a month by OMAFRA. It is anticipated that once the new Food Safety Decision Support System is completed for dairy (by early 2000), the report turnaround time will be improved.

RECOMMENDATION # 3
TO OMAFRA

FORWARD CONTRACTING

To support any move towards forward contracting of meat goats. The forward contracting of lambs has already produced feedback on quality to the producers; a similar scheme for meat goats would have

Response
***Omafra* – Agriculture & Rural Division** A forward contracting initiative for kid goats is supported by Ministry staff. Discussions are ongoing with the industry to explore opportunities for this type of initiative.

RECOMMENDATION # 4
TO OMAFRA

FIBRE QUALITY

To help the fibre segment of the industry, support is required for the establishment of standards for fibre. These already exist in other countries and could easily be used in Ontario. Classifying fibre to standards would encourage producers to produce an improved product and increase the value of fibre.

Response

***Omafra* – Agriculture & Rural Division** Testing for fibre quality is available at the Yocom - McColl Laboratory in Denver, Colorado. This laboratory will conduct a complete assessment of the fibre and assign a score to the fleece. It is recommended that Ontario producers of goat fibre avail themselves of this testing facility to gain experience and knowledge of the quality and grade of Ontario produced fibre.

DISTRIBUTION OF 1998 RECOMMENDATIONS

Recommendation	ARIO	AAFC	OMAFRA	U of G
Health	X			X
Genetics		X	X	
Nutrition				X
Product development				X
Reproduction	X			X
Management		X		X

1999 RESEARCH & SERVICES RECOMMENDATIONS

Since no research has been funded or initiated in Ontario in the past year, the priorities for 1999 remain the same as last year with minor addition of objectives in some instances, and combination in others.

Recommendations 1 (health) and 5 (reproduction) have been identified as major priorities.

RECOMMENDATION # 1 **PRIORITY 1B**
TO ARIO, U OF G

HEALTH

OBJECTIVES

1. Determine the impact of the major production limiting diseases, and develop economic methods for their control and eradication.
2. Investigate the causes, control and prevention of neonatal diseases in kids.
3. Evaluate the results of research into common pathogens elsewhere in the world, and if applicable, apply the findings to the control of these diseases in the province.
4. Investigate the prevalence of zoonotic diseases and their significance to the public's health in the province.
5. Investigate the development of computer systems to assist producers in their herd health and production management systems.

BACKGROUND

As the goat industry continues to develop, health management needs to move from the identification of the simple, single pathogen disease to the recognition of the multifactorial diseases involving one or more pathogens, the environment, nutrition and genetics. To solve these problems a multidisciplinary approach, using many techniques is needed.

TO AAFC, OMAFRA
RECOMMENDATION # 2 **PRIORITY 1A**

GENETIC IMPROVEMENT

OBJECTIVES

1. To develop genetic improvement programmes to measure in herd and across breed improvements
2. To compare the performance and productivity of the present breeds in Ontario.
3. To develop Expected Progeny Differences (EPD's) for economically important traits.

BACKGROUND

The introduction of the Boer goat has stimulated interest in the production potential of these and the native breeds under Ontario conditions. In the past there has been very little work in this area. As a start, the computer infrastructure of the Sheep Flock Improvement Programme can easily be adapted by adding goat breeds to the current sheep programme, so that data can be collected to develop goat adjustment factors.

RECOMMENDATION # 3 **PRIORITY 1A**
TO U OF G (PROF. CANT)

NUTRITIONAL STANDARDS FOR ONTARIO GOATS

OBJECTIVES

1. To develop a nutrition computer model for the growing kid and the breeding doe raised under Ontario conditions and production systems.

BACKGROUND

Much of the data used to formulate goat rations have been derived from work in climates, environments and production systems very dissimilar to Ontario. The development of this model would give producers information and tools to improve feeding management appropriate to this province. The end result being improved production (both meat and milk) and carcass quality.

RECOMMENDATION # 4 **PRIORITY 1A**
TO U OF G, FOOD TECHNOLOGY
PRODUCT DEVELOPMENT & PRODUCT QUALITY

OBJECTIVES

1. To investigate genetic and management factors that can affect the consumer quality of milk and meat.

2. To evaluate the genetic components of economically important carcass traits and their value to the producer.

BACKGROUND

Various factors affect the quality of milk. Some of those believed to affect goat milk quality are very different from those known for cow milk. These need to be investigated and understood so producers can deliver the quality of milk needed for continued growth and expansion of current markets for cheese and fluid milk.

RECOMMENDATION # 5 **PRIORITY 1A**
TO AAFC, ARIO, U OF G
REPRODUCTION

OBJECTIVES

1. Apply new reproductive technologies to goat breeding, including embryo transfer technologies, improved semen handling and storage, and the hormonal manipulation of the estrus cycle.

2. Investigate the causes of reduced reproduction performance at both the individual and herd level, the control of abortion and other failures.

3. Investigate the use of MGA (melengesterol acetate) as an economic alternative in out-of-season breeding programs, and synchronization in meat and dairy goat herds.

BACKGROUND

The causes of poor reproduction in the goat herd often go unrecognized and unresolved, but can markedly reducing productivity. The effective application of modern reproductive techniques can only succeed if there is, initially, good reproductive performance in the herd. By the use of modern reproductive technology the herd can be managed more efficiently labourwise, allowing more goats to be handled by the same labour force.

RECOMMENDATION # 6 **PRIORITY 1A**
TO AAFC, OMAFRA, U OF G

MANAGEMENT

OBJECTIVES

1. To investigate management systems that will provide optimum production for the different segments of the Ontario herd.

2. Evaluate the output and economics of different production systems (e.g. intensive housing v. pasture grazing, accelerated v. once a year kidding etc.)

3. Evaluate different housing and management systems through all seasons for the raising of kids.

BACKGROUND

Because of Ontario's wide climatic variations, established management systems need to be modified to provide the optimum for production. The systems are there, all that is needed is to adapt them to suit this province. The correct management system for a particular operation will not only increase production, but also enhance animal welfare.

1999 RESEARCH & SERVICES RECOMMENDATIONS

RECOMMENDATION # 1
TO OMAFRA

TECHNOLOGY TRANSFER

- As the goat industry continues to grow and develop, technology transfer becomes more increasingly important. Development of the industry is dependent on producers being of viable commercial size, be it dairy or meat goat production. This requires that good leading edge information and extension support be available. The following are areas of primary importance:
- technology transfer to leading edge producers is essential, particularly in the areas of health, reproduction, nutrition, production, genetics, and management systems.
- ongoing support of the predator information officer, the compensation program and a continued evaluation of predator control methods, since predators continue to restrict expansion of the meat goat industry, where producers are trying to take advantage of lower feed costs of pasture use.
- continued emphasis on developing goat resources and extension materials.

RECOMMENDATION # 2
TO OMAFRA, U OF G (LAB SERVICES DIVISION)
MILK QUALITY SAMPLING & TESTING

The industry appreciates OMAFRA's & University of Guelph's efforts in the 1998 trial project. However, steps need to be put in place to ensure that **at least one sample is tested for quality, each month for every producer in the province.** With the increasing emphasis on Quality Assurance programs in the processing sectors, goat producers not only need the results of quality testing, but in a timely manner that the report can be used to make immediate adjustments and corrections to management if necessary. OMAFRA is urged to develop an effective sample pick-up system to meet their obligations under the Milk Act and Regulation 761.

DUTIES AND TERMS OF REFERENCE OF THE COMMITTEE

1. To review goat research and services being carried out in Ontario.
2. To identify problems facing the goat industry requiring investigation.
3. To assess relevance of research and service programmes and suggest priorities for new research.
4. To recommend the expansion or termination of programmes already under way.
5. To assess programmes on a cost benefit basis.
6. To liaise with researchers on the progress of research and services

COMMITTEE MEMBERSHIP

Name	Location	Affiliation	Term to
Dr. John Martin	Sheep, Goat & Swine Health Management Wellington Place, R.R. #1, Fergus, N1M 2W3 Tel. 519-846-0965 Fax 519-846 -8101 E-Mail jmartin@omafra.gov.on.ca	OMAFRA	2002
Dr. Brian Buckrell	Dept of Population Medicine, OVC, U of Guelph, Guelph, Ont, N1G 2W1 (519) 824-4120 ext 4011 FX (519) 763-8621 Email bbuckrell@ovcnet.uoguelph.ca	U of Guelph	2003
Anita O'Brien Committee Chair	Sheep & Goat Specialist – Production Systems Ontario Government Building, PO Box 2004 Kemptville ON K0G 1J0 (613)258-8299 FX (613)258-8392 E-mail aobrien@omafra.gov.on.ca	OMAFRA	2001
Dr. Paula Menzies	Dept. of Population Medicine, Ontario Veterinary College, University of Guelph, Guelph, N1G 2W1 Tel. 519-824-4120, Ext. 4043 Fax 519-763-8621 E-mail pmenzies@ovcnet.uoguelph.ca	U of Guelph	2002
Delma Kennedy	Sheep Specialist – Repro., Breeding & Genetic Improvement Programs Livestock Technology, O.M.A.F.R.A. 1 Stone Road West, Guelph, N1G 4Y2 Tel. 519-826-3290 Fax 519-826-3254 E-mail dkennedy@omafra.gov.on.ca	Genetics	2001
George Mournaghan	R.R. #2, Grand Valley, ON LON 1GO Tel. 519-928-2176 Fax 519-928-9977	Ontario Goat Breeders Association (Dairy)	2000
Mary Lou Clarke	R.R. #1, Dutton, NOL 1JO Tel. 519-762-3313 Fax 519-762-0188	Ontario Goat Breeders Association (Meat)	2000
Pat Marcotte	R.R. #1, Wahnapitae, POM 3CO Tel. 705-694-5686	Ontario Goat Breeders Association (Fibre)	2000
Caroll Thomas	RR # 1 Orton, ON L0N 1N0 (519)855-6596	Ontario Goat Milk Producers' Association (Dairy)	2001

ONTARIO PORK RESEARCH AND SERVICES COMMITTEE

EXECUTIVE SUMMARY

This report summarizes the recommendations of the Ontario Pork Research and Services Committee for 1999. The major issue on the production side of the pork industry remains the environment. Several municipalities have actually halted construction of barns from proceeding. Many have now enacted or are in the process of enacting bylaws requiring that a nutrient management plan be submitted before a permit for a new building is issued. The reduction of odours from barns, storage and manure spreading and the development of acceptable manure spreading criteria and manure treatment systems to reduce the potential for surface and ground water pollution remains a high priority to allow for the continued growth of the swine industry in Ontario. A second area of concern, which is growing quickly, is the safety of pork. The public is hearing more about antibiotic resistant organisms, outbreaks of food poisoning, emergence of new diseases (e.g. Mad Cow) linked to meat, residues in meat, and the potential risks of using genetically altered plants and animals. European and US producers are further along in their development of quality control and HACCP programs, which could be used against us in marketing of Ontario pork. The committee suggests 2 meetings for next year to develop the next major report. One will be held in April or June and the second during September.

COMMITTEE ACTIVITIES

The Committee met on September 10, 1999 at the OMAFRA offices, 1 Stone Road, Guelph. The proposal for the various areas of swine research and services were assigned to committee members for updating. These were then reviewed by the committee as a whole and are presented in this report. The Committee is made up of a cross-section of the pork industry including researchers, OMAFRA, Ontario Pork, producers, feed, packing, genetic, engineering industries and services. An attempt was made to rank the individual recommendations and the objectives within the recommendations in order of priority

STATE OF THE INDUSTRY

The number of swine farmers in Ontario continues to decline with 566 producers or 9% leaving the industry in 1998. The boom in swine building construction over the past several years replaced the capacity lost to the retirement of facilities. This rate of expansion has been slowed, and there has been a decrease of 2% in the size of the Ontario sow herd compared to a year ago. Still, the weekly marketing's which averaged over 83,000 in August 1998 increased to 89,467 in August of this year.

The Ontario Swine Industry from 1994 - 1998

	1994	1995	1996	1997	1998
No. of producers	7,678	7,423	6,780	6,068	5,502
No. of sows & bred gilts[1]	320,000	317,000	323,000	317,300	340,100
No. of pigs<20kg[1]	925,000	908,000	960,000	977,000	1,068,700
No. of pigs>20kg[1]	1,723,000	1,850,000	1,764,000	1,813,700	1,906,500
Hog sales by auction	2,530,080	3,019,744	2,781,316	2,293,340	2,231,000
Hog sales by contract	1,101,230	754,677	986,341	1,522,181	2,145,475
Total sales (including sows and boars)	3,711,715	3,829,536	3,785,664	3,822,136	4,380,922
Market hogs sold to US	44,754	203,908	516,971	722,967	741,031[2]
Pool price ($/ckg)	$147.26	$151.68	$188.70	$186.69	$121.42
Weaner pig price ($/kg@25 kg)	$1.85	$1.79	$2.45	$2.84	$1.69
Feed cost per finishing pig (25kg-Market)	$55.07	$54.69	$68.83	$62.05	$53.29

1.A t July 1st.

2.A s reported by Ontario Pork.

Trends, 1998 to 1999:

Pigs on farms	1 July 1998	1 July 1999	% change
No. of sows and bred gilts	340,100	333,800	-1.9
No. of pigs < 20 kg	1,068,700	1,108,800	+3.8
No. of pigs > 20 kg	1,906,500	1,924,800	+ 1.0
	August 1998	August 1999	
Market hog sales	332,794	357,868	+7.6
Pool price for finished pigs ($/ckg)	$139.18	$138.17	-0.7
Price for weaner pigs ($/kg@25 kg)	$1.58	$1.49	-5.7
Feed cost/ finishing pig (25kg-Market)	$49.64	$50.03	+0.8
	1 April 1998	1 April 1999	
Hogs on Ontario Farms[1]	3,256,200	3,284,600	+0.9

1. Source: CPC.

Non-Market Hog Exports to the United States[1]:

Year	Feeder Pigs	Barrows/Gilts	Boar/Sows	Total Hogs
1999	1,078,374	795,598	300,495	2,174,467
1998	649,211	1,015,300	480,893	2,145,404
% Change	**66%**	**-22%**	**-38%**	**1%**

1.A s of Week Ending July 30, 1999

Source: Agriculture & Agri-Food Canada and USDA, APHIS.

The Ontario industry has come through a period where prices have gone from historical highs to record lows over the past 24 months. The price for market pigs fell to below $0.40 in December 1998, and the industry was in crisis. Prices began to rise through June 1999, but have stalled in the $130s. The OMAFRA August 1999 Net Returns for farrow to finish are calculated to be $4.28. The low returns in the pig industry are a worldwide phenomenon.

There were 2 major causes cited by most observers. The first was the significant reduction in demand in Asia as they went through their economic problems. The second was the increase in the supply of pork fueled in part by the expectation that the Asian market would continue to grow. Many point to the development of the large corporate farms in the USA as the sole cause of this overproduction. However, most swine farms of all sizes that have stayed in the business are keeping more pigs and have higher productivity than ever before. Quality Meat Packers experienced a labour strike in December, forcing the transport of hogs over long distances to find slaughter space, which incurred high transport costs for producers on top of extremely low prices.

The provincial and federal governments introduced aid programs to assist all farmers in a year that has seen disastrous weather and disastrous commodity prices across Canada (and the US).

There is concern among many industry observers that a failure to achieve a reduction in the North American breeding herd may lead to a recurrence of last December's price crash this coming fall/winter. In addition, Olymel, a Quebec packer, is facing a strike situation in October. This would place Ontario producers in jeopardy if Ontario packers opt to purchase Quebec hogs. Many, if not most, Ontario producers could not withstand another decrement in their equity such as they experienced last winter.

One of the stated objectives of the US National Pork Producers Council is to pursue export of hogs to Canada. This is possible in light of relaxation of Canadian restrictions based on the objective of preventing pseudorabies invasion.

Across North America, while producers have suffered critical losses in equity, packers are posting record profits. A great deal of discussion has been devoted to the search for a solution to the problem at a basic level. While there is generally agreement that something needs to change, it is difficult to lead all partners to a common table and find a common solution. There are initiatives to attempt this. There are also producer initiatives to find producer-built alternatives. Producer-initiated alliances may allow the sort of coordination necessary for survival, as an alternative to US-style integration. Unfortunately, the industry in Ontario is fragmented as regards the best way forward.

In light of the price crash, the Ontario Pork 'Industry Marketing Task Force' report and recommendations have been shelved, perhaps permanently. Ontario Pork is providing enhanced contracting strategies under a new marketing initiative, which is intended to be competitive with direct packer contracts. The environmental concerns of rural residents have caused a growing number of municipalities to implement increasingly stringent restrictions on the siting of barns and the disposal of manure. In some instances, court action has impeded construction of buildings that have met all requirements and recommendations set out by the

local municipality and the province. This challenge to the industry is, if anything, gaining momentum. Unfortunately, it may also be gaining ammunition with recent developments. Faulty construction has allegedly resulted in leaking manure stores; studies are planned to determine the extent of this problem. Odour problems have led one municipality to consider purchasing a barn to stop its operation if this occurs, it seems certain that this municipality will strive to prevent further construction. In Kent, rural residents were granted a reduction in property tax because odour from a nearby swine barn was considered to reduce the value of their property.

A promising announcement, which received international media attention, was that of the 'Enviropig', a transgenic animal with improved ability to use dietary phosphorous. This exciting development could lead to reduced phosphorous load on the environment and reduced cost of production in terms of phosphorous additions to feed.

A change in the determination of the Ontario daily base price for live hogs was introduced this year. The new mechanism is based on the USDA's National Base Lean Hog Carcass Slaughter Cost.

Food safety concerns of consumers have spawned the introduction of quality control programs by both producers and packers. The Canadian Quality Assurance Program (CQA) is being delivered at this time, although it has probably suffered by being introduced during what are, for many producers, difficult financial times. OMAFRA's swine advisory staff have been enlisted to assist in delivery of the producer information seminars. As of 23 August 1999, 1341 CQA manuals have been purchased, representing annual sales of 1,851,895 hogs. Nineteen farms have been 'CQA recognized'; a large number of producers are expected to achieve this recognition in the fall months.

ISSUES FACING THE ONTARIO PORK INDUSTRY

1. There is a growing animosity by rural residence towards the establishment of intensive livestock operations. Township councils are being canvassed by local citizens groups to bring in bylaws to restrict the growth of swine operations. There are many reasons cited for this concern including surface and ground water contamination and the corporate takeover of agriculture. In many cases, the primary concern is the potential for increased odours from the barn, the storage and from spreading. Building contractors are finding that projects are more likely to be held up by delays in getting building permit approval than by financing. Nutrient Management Plans and Mds guidelines have been established based on the best information available. These are important developments but they are not based on scientific facts in all areas. There is growing criticism of these tools by the public. This criticism is based on perception and fear of the unknown by various groups and is highly organized. A scientific base to support the recommendations and guidelines is urgently needed for a sustainable and viable pork industry in Ontario.

2. As the swine industry continues through its worst down cycles in recent memory, as always there is the question of survival of the participants. What is new this time is that this is the

first downturn since the arrival of the so-called loops and how fiscally sound they are is unknown. If they should start to falter, it will have implications for large number of individuals who are under contract to them.

3. Consumer acceptance of biotechnological techniques is an issue for all segments of agriculture. In pork production, improvements in pig performance (feed efficiency), meat quality (extended shelf life), pig health (protection against viruses) and the reduction of the nutrient concentration of manure (phytase gene) are some of the areas presently being investigated. Some in society are questioning the implications of such manipulation and ultimate implications for human health as well as vulnerability of these pigs to other diseases. Currently, GMO products are suspect by the general public and pork fed these products may not be acceptable or would be at a competitive disadvantage in export markets. A big job lies ahead to sell the beneficial concept of biotechnology to the end consumer in order for the advances and advantages.

4. Similar to the above, quality assurance of pork is a growing issue. Consumers are hearing more stories of meat contaminated with Ecoli and other bacteria and wonder when an equivalent to Mad Cow Disease will affect pork. Recent articles in the media have suggested the use of atimicrobials particularly for growth promotion in food animals has the potential of developing antibiotic resistant bacteria. The pressure is likely to increase as several European countries having restricted the use of such drugs and will be using this in their promotion for their export sales.

RESPONSE TO 1998 RECOMMENDATIONS

Response

ARIO

Research Priority Areas (as directed to ARIO):
1) Environmental Issues; 2) Behaviour; 3) Quality & Safety; 6) Reproduction

The ARIO accepts the above priorities as the 1998 research priorities of the pork subcommittee as directed to the ARIO. It is acknowledged that the intent of these priorities remains the same as in 1997. Some additional detail has been added to their objectives. The University of Guelph will take this into account in the next call for research proposals.

The current pork research program at the University of Guelph supports the above priorities through work, which can be done according to the following research objectives:

Priority 1: can be addressed through:	Objective 1;
Priority 2:	Objective 2;
Priority 3:	Objective 3;
Priority 6:	Objective 6.

The Objectives and Goals of the Pork research program can be viewed at the university's web Site at: http://www.uoguelph.ca/research/omafra/animals/objpork.html

RECOMMENDATION: #1
TO ARIO, OMAFRA, (U of G)

ENVIRONMENTAL ISSUES

To focus research on Environmental Issues - Indoor and Outdoor - and develop systems which reduce environmental impact as well as improve the performance, health, safety and comfort of pigs; and health and safety of operators.

BACKGROUND

Concern is growing in Ontario and world-wide as to the effect swine production has on the air, water and soil. This will accelerate as the move to larger operations leads to a greater potential for pollution related to storing and spreading of manure. Further, society has a growing concern for the welfare of the pigs as well as to the long-term health of the operators of these facilities.

DETAILS

To evaluate the impact that swine production has on the environment in the areas of alternative manure storage, manure application, disposal (value added), and its effect on soil and water pollution. To look for technology (i.e. transgenic pigs) that will reduce any negative impact of swine production through:

-the reduction or balancing of the nutrient content of the feed
-improved feed utilization
-reducing odour associated with swine manure.

To test methods and instrumentation for the assessment of odours from swine operations and to use these methods to evaluate various swine barn and ventilation systems such as:

-tunnel ventilation vs. side wall fans vs. roof fans
-under barn storage vs. open top concrete tanks vs. earthen storage
-dry vs. liquid manure systems;

To determine the optimum siting of swine barns for odour management, disease transmission and the acceptance by the community. To evaluate the safety risk to pigs and people associated with manure removal in various styles of swine barns. Specific projects would include:

-gas hazard potential of different types of swine barns
-the popularity of under barn storage has generated new styles of finishing barns some of which avoid in barn agitation of manure and may be less hazardous

These need to be tested:

-development of a low cost alarm system to warn of high levels of hydrogen sulphide when cleaning out a barn
-to develop an attachment mounted to the manure pump, which would close of the pump out port of in barn storage. The objective would be to restrict air from entering the pit and potentially gassing the pigs

Response
UNIVERSITY OF GUELPH: These details are being addressed in the following projects:

Project No.	Project Leader	Project Title
22560	de Lange, K	Evaluation of a simple means to represent the response of growing-finishing pigs to energy intake
22760	Filson, G	Evaluating the Public's Response to Pork Production in Waterloo Region and Perth County
22770	Bunce, N.	Amelioration of odours from hog manure by electrochemical treatment
22890	Negi, S.	Improved Methods of Manure Storage Construction
23170	Phillips, J.	Application of transgenic methodology in seine for reduced environmental impact an enhanced carcass quality
19150	de Lange, K	Effect of Feeding Strategy on Energy Expenditure an dAmino Acid Catobolism in Visceral Organs

Further details on the above projects can be found at the University website at:
http://oasis.uoguelph.ca

RECOMMENDATION: #2
TO U OF G, AAFC LENNOXVILLE, ARIO, CARC
QUALITY & SAFETY

To improve pork safety and quality, thus enhancing consumer confidence and acceptance of pork and pork products

BACKGROUND

Consumers are concerned about the safety of food. Perception becomes reality on this subject. Competitors are promoting pork products from production systems focused on pathogen monitoring and minimization of anti-microbial use.

Specific concerns are contamination of food with pathogenic or spoilage micro-organisms or industrial and agricultural chemicals which could result in food poisoning. Research is needed to determine the extent of and the reasons for the various types of contamination and how these can be prevented. Because knowledge about controlling these contamination sources is least developed as it applies to pre-slaughter handling and production, research directed at developing effective on-farm HACCP programs and strategies is needed. As a control measure to ensure the integrity of pork products and protect both domestic and export markets, development of quick and reliable on-site tests for the detection of microbial agents and chemical contaminants in pork are needed.

A growing area of concern is the possible development of anti-microbial resistant bacteria. Research is needed to study the effects of anti-microbial use as it relates to food safety and develop alternative strategies or systems. Developments in human medicine and possible use of pig-derived transplant parts produces a new area of risk for the development of unidentified and

potentially very serious new health risks associated with pork production.

Backfat levels in pork carcasses continue to be reduced through improved genetics, nutrition and management. This has been accompanied by a decrease in intramuscular fat with reductions in flavour, juiciness and to some extent tenderness. Research is needed to determine how we can reduce fatness while maintaining the eating quality of pork. There is also a need to determine ways of altering fat distribution on carcasses to satisfy demands for specific products and to be capable of tailoring genotypes and production systems to these specific demands.

Product consistency for pork products is becoming more critical in meeting consumer demand. Reducing variability in the delivered product will be important in gaining market share for pork products both domestically and in export markets. Research is needed in the area of variability within genotypes as it relates to meat quality and consistency.

A variety of new alternative feedstuffs, derived from the consumer and food manufacturing sector are available for swine. The quality, variety and demand for these products has increased dramatically in the past few years. There are risks associated with the use of some of these products, particularly in the area of carcass composition, meat quality and consumer acceptance. These alternative feeds need to be classified with respect to human and animal safety, nutritional value and effect on meat quality. Satisfactory inclusion levels and the additive effects of combinations of flavours and different fatty acids should be evaluated before these products are utilized in swine feeding programs. Consumer satisfaction unrelated to the issue of opportunity feeds is becoming a differentiating factor in the marketing of pork products. Research should be directed toward development of knowledge about sensory characteristics of pork and their adjustment.

PSE (pale, soft, exudative) pork remains a serious problem in the Canadian pork industry. PSE is responsible for direct financial losses domestically and reduced sales internationally. The discovery of the PSS gene and the subsequent efforts to eliminate it from the pork population will **not eliminate PSE pork.** Research is still needed on how to reduce the impact of current marketing, transportation and slaughter practices on the development of PSE in pork as well as on the welfare of the pig.

DETAILS

Develop effective pre-slaughter HACCP programs and the systems to respond to new challenges to the effectiveness of these programs that can be implemented across the production industry.

Study the impact and control of food borne disease agents. Develop strategies for low or zero anti-microbial product use in swine production. Develop emergency systems for monitoring and controlling specific disease organisms which have the potential for developing into public health or food safety issues. One example of this topic area from another species is the agent responsible for BSE in Cattle.

Determine the impact of new opportunity feeds on pork quality, including oxidative stability and taste, safety and consumer acceptance. Include nutritional and processing guidelines for the safe

and effective use of each specific product. Continue the development of quantification and control measures for factors in meat that affect the taste and consumer acceptance of pork products.

Develop technology for the prediction of meat quality for measurements taken on the live pig to support both genetic and management decisions leading to an overall increase in pork quality. Develop a comprehensive carcass grading and evaluation system that incorporates measures of pork quality including the distribution of muscle and lean and the quantitative measures of yield. Systems should be to provide means for genetic improvement in specific meat quality related characteristics and in their variability of expression. Determine and evaluate the relative important of the factors responsible for the wide variation in composition of pork carcasses and develop production systems to produce more uniform carcasses.

Continue the development of methods and systems for detection, control and reduction of the following in pigs and pork products:

-quality defects such as PSE
-drug residues and other contaminants
-pathogens and spoilage micro-organisms

Response

AAFC - The specific details as contained in this recommendation are related to the Lacombe Research Centre and the Dairy and Swine Research and Development Centre for them to take into consideration vis-a-vis their research programs. In Lacombe, research is conducted on ante- and post-mortem factors that influence pork yield, quality, safety and preservation. The Dairy and Swine Research and Development Centre focuses on improving the productivity and profitability of swine production. There are also pork quality / molecular genetics researchers on staff at Lennoxville.

A sample of the recent research output from Lacombe that contribute towards pork quality and safety include (a) ante-mortem: screening of local Hampshire pigs for the RN gene; genetic test for the dominant white gene in swine; nutritional treatment effects on growth, yield and meat quality; marbling levels and fat; conjugated linoleic acid; pre-slaughter feed restriction; natural lighting, role of vitamin B6, and stress on pork quality; control of barn odour; (b) slaughter / dressing / carcass value: computer vision hog grading; and (c) packaging/preservation/safety: equipment cleaning; carcass pasteurization; salmonella; spoilage control; intervention strategies; display-ready pork; returnable, reusable, non-mechanically-refrigerated container; spoilage control with bacteriophage.

It is noteworthy that a (second) national research and technology transfer strategy workshop is planned for early 2000, with the support from the Canadian Pork Council, Agriculture and Agri-Food Canada, etc.

RECOMMENDATION # 3
TO U OF G, AGRICULTURE CANADA, OMAFRA

Alternatives to the sub-therapeutic use of anti-microbials in swine feed. Mathematical modeling of swine growth and development and continued investigation of methods to reduce the incidence of mycotoxins in swine diets.

BACKGROUND

The demand for residue-free product will continue to be an issue in the export and domestic sales of Ontario swine products. The use of sub-therapeutic levels of anti-microbials (as growth promotants) is a concern to the general public in Ontario as it relates to food safety. The use of anti-microbials in feed is being increasingly limited in Europe and other areas of the world. Research is required in order that Ontario producers can compete economically in a system that minimizes or limits the use of sub-therapeutic anti-microbials in feed.

Feed accounts for 60-65% of the total cost of producing a market hog and offers major opportunities for improving profitability. To remain competitive swine diets must be continually updated to keep pace with improvements in animal performance. Technologies such as segregated early weaning and three site production systems are being adopted by the Ontario pork industry and are leading to unprecedented improvements in health status and growth performance. In addition, genetic improvement and growth promotants continue to improve lean tissue growth rates of swine. The combined effects of these advancements is to increase the complexity of predicting the nutrient requirements of swine. There is an immediate need to expand and apply existing swine growth simulation models through basic and applied research and make them available to the industry. Models are the only effective tool to develop the optimum feeding and management strategies for individual pig units. Models can also be used to identify means to reduce the excretion of excessive nutrient intake in pig manure addressing an environmental concern.

Swine producers in Ontario continue to suffer losses due to mycotoxin contamination of corn and wheat. These losses result from feed refusal and disruptions of breeding herds. Recently, significant advances have been made in the control of some mycotoxins. Current research efforts at the University of Guelph merit continued support given the potential negative impact mycotoxins could have on pig performance and financial viability. Research to develop fusarium/mould resistant corn needs to be supported.

Liquid feeding systems are becoming more prevalent in Ontario. Most of the information and research is from Europe and is not applicable to the Ontario situation (differing feedstuffs, genetics, temperatures etc.).

DETAILS

To investigate alternatives to the use of sub-therapeutic levels of anti-microbials in feed, which will maximize profits in finishing barns.

To evaluate the nutrient requirements of swine using a factorial (modeling) approach. Emphasis

should be placed on effects of health status, immune system stimulation, genotype, environment and their interactions on growth and development an predicted nutrient requirements of starter pigs, grow-finish pigs and sows. Models cold be used to determine the strategy needed to feed a specific group of pigs to their genetic end environmental potential as economically as possible.

To develop methods to reduce the adverse effects of mycotoxins on swine. To develop fusarium resistant corn.

Develop specific recommendations for liquid feeding in Ontario.

Response
UNIVERSITY OF GUELPH: These details are being addressed in the following projects

Project No	Project Leader	Project Title
22560	de Lange, K.	Evaluation of a simple means to represent the response of growing-finishing pigs to energy intake
22640	Smith, T.	Effect of nutritional supplements on Fusarium mycotoxicoses in swine
22690	Fan, M.	Preferential Requirements of Trophic Nutrients for Gut Muscosal Growth in
23740	Dewey, C.	Variation in pig weight gain-determining the distribution and associated factors
16750	de Lange, K.	Post-absorptive efficiency of threonine, methionine and cysteine utilization in grower-finisher pig
19150	de Lange, K.	Effect of Feeding Strategy on Energy Expenditure and Amino Acid Catabolism in visceral Organs

Futher details on the above projects can be found at the University website at:
htp://oasis.uoguelph.ca

RECOMMENDATION #4
TO AAFC, CARC

HEALTH

To conduct research in order to improve health and productivity of Ontario swine

BACKGROUND

Strategies for reducing the prevalence of disease in swine herds have been employed by many Ontario pork producers. Depopulation and repopulation with minimal disease animals, strategic medication to eliminate specific diseases, and all-in/all-out management systems are examples of common techniques that are being used to create a better health status for Ontario pigs. Another important aspect of these strategies is that antibiotic use can be reduced and thus the risk of residues and the development of antibiotic resistance may be reduced.

As a result of these and other changes to the Ontario swine industry, the emphasis placed on

infectious disease research needs to be shifted from the treatment and control of traditionally important diseases to studying health security and disease monitoring. There are diseases that are now emerging as important problems under these management systems. These diseases include Porcine Reproduction and Respiratory Syndrome (PRRS), Streptococcus meningitis, Mycoplasma infections, and Glasser's Disease. Recently, post-weaning colibacillosis has become a significant problem and requires investigation. New diseases continue to arise. Most recently, Post-weaning Multi-systemic Wasting Syndrome (PMWS) has been identified as a possible cause of economic loss in Ontario nurseries.

DETAILS

To investigate the negative effect of subclinical disease and immune stimulation on growth performance and to study means by which losses in growth performance can be reduced. In particular, work needs to be directed at reducing the growth variability caused by disease.

To investigate methods of eradicating or controlling infectious diseases and methods of monitoring to ensure herds remain free of specific diseases. As well, methods of reducing the use of antibiotics and reducing the risks of antibiotic residues and the development of antibiotic resistance need to be investigated.

To investigate disease spread from herd to herd and within herds. This work should include studies dealing with the development of immunity in herds particularly when production stages are separated.

To continue to do research on economically important infectious diseases to better understand pathogenesis, epidemiology, and control strategies. Particularly work needs to be carried out on newly emerging problems such as Colibacillosis and Post-weaning Multi-systemic Wasting Syndrome.

Response
AAFC: Details as contained in this recommendation are related to the Dairy and Swine Research and Development Centre for them to take into consideration vis-a-vis their research programs. The Dairy and Swine Research and Development Centre focuses on improving the productivity and profitability of swine production.

RECOMMENDATION #5

HEALTH

CFIA:"In 1997, the Canadian Animal Health Network (CAHNet) was formed to further collaborative domestic actions in support of Canadian exports of animals and their products within the increasingly competitive marketplace created under the World Trade Organization. The CAHNet agribusiness and veterinary infrastructure partners work together to improve disease reporting relationships from the producer through to the Chief Veterinary Officer level, that rumour and innuendo concerning Canada's animal health status might be replaced by facts and figures.

While the process focuses on marketability, we recognize that the line between it and productivity often blurs. To that degree, the partnership exercises a degree of flexibility in the breadth of activities it supports. To that end, as a case in point, it has worked to further the exchange of information domestically and internationally in respect of PMWS through the production of reports and the conduct of multi_disciplinary teleconferences among stakeholders including the Canadian Pork Council. A federal epidemiologist was offered in 1998 as a resource towards conducting a case control study of infected and unaffected herds in Western Canada.

The disease reporting improvements being effected by CAHNet partners in the name of marketability, through venues such as the above collaboration and the HACCP Surveillance Workshop held last December in conjunction with the meetings of the Canadian Animal Health Consultative Committee, will equally profit those seeking better handles on production_limiting conditions such as those cited. While it does not enter as a whole into herd_based studies of common production_limiting conditions, CAHNet embraces those who do within its inclusive membership, such that the issue might be given a broader airing throughout the agribusiness and veterinary community within the context of all problems challenging the industry, before an assembled group of considerable experience in the area."

RECOMMENDATION #6
TO ARIO, CARC

REPRODUCTION

To conduct research into improving reproductive efficiency and increasing perinatal survival.

BACKGROUND

There has been a rapid acceptance of artificial insemination in the Ontario swine industry resulting in an increased need for research in this emerging technology. A trend toward earlier weaning ages has caused a need to study the effects of short lactation length on reproductive performance. Another development in the industry is to all-in/all-out management of nurseries and grower-finisher facilities. This has led to the use of batch farrowing on certain farms. There is a need to examine techniques for synchronising estrus, possibly through hormone manipulation., to assist producers using batch farrowing systems, but also to help maintain pig flow on weekly farrowing units as well.

The economic importance of predictable and controlled reproductive performance can be measured in pigs produced and physical resource utilization. The potential for improvement in litter size, farrowing rate, and early puberty is great.

DETAILS

To investigate the physiology of the boar including means of improving AI, semen quality, and management factors associated with breeding.

To investigate factors associated with early embryo viability with the view of reducing embryo

mortality and exploring more feasible methods of embryo transfer.

To investigate the physiological environmental and disease factors associated with parturition and neonatal viability including lactation failure.

To investigate methods of improved control of the female reproductive cycle to allow producers better utilization of facilities and better pig flow.

RESPONSE (See ARIO at beginning of this section Page # 141

RECOMMENDATION # 7
TO U of G, AGRICULTURE CANADA
BIOTECHNOLOGY

To utilize and develop biotechnology to enhance the performance of the pork industry.

BACKGROUND

Biotechnology is the most powerful emerging technology of our time. Decoding the genetic information that drives life processes in all living things -microbes, plants, animals (pigs), humans -unlocks the door to unparalleled (economic) opportunities. Specific opportunities visualized are the following:

- Microbial control of biological waste (manure) should be researched so as to influence the odours and detrimental products from swine manures.

The pork industry should be lead to develop to more fully suit human needs. No longer do we need to be constrained by the deficiencies of the pig. Biotechnology research should be undertaken in the following areas:

-novel pork products
-higher nutritional value pork
-superior growth rates and feed efficiency
-superior reproductive performance

Sustainable pig health care through revolutionary approaches to:

-diagnosis
-prevention of disease
-treatment of disease

DETAILS

To apply transgenic methodology for the introduction of genetic traits into pigs to modify specific characteristics (SOD and PHY Genes).

To continue to develop genetic markers for rapid advances of desirable traits in the pig.

To commence genome research which represents a very active area of biological discovery. Scientist are encouraged to become active and leverage the global scientific community to enhance pork production.

Response

AAFC: While not directly involved in transgenic nor cloning research, both the Lacombe Research Centre and the Dairy and Swine Research and Development Centre have molecular biologists on staff, carrying out research relating to genetic marker etc. In addition, the specific details as contained in this recommendation are related to these two Centres for them to take into consideration vis-a-vis their research programs.

UNIVERSITY OF GUELPH: These details are being addressed in the following projects:

Project No.	Project Leader	Project Title
23170	Phillips, J.	Application of transgenic methodology in swine for reduced environmental impact and enhanced carcass quality.
23310	Gibson, J.	Quantitative and molecular genetic improvement of swine.
23690	Pollard, J.	Development and Field Testing of Reproductive Biotechnologies for the Elimination of Disease and Germ Plasm Conservation in Swine.
13870	Basrur, P.K.	Reproductive problems in translocation carrier pigs.
15390	Squires, J.	Major genes affecting pork production and meat quality.
16740	Blecher, S.	Antibody sexing of porcine sperm.
19350	Hayes, T.	Ficolins as Markers for Resistance to Bacterial Diseases in Young Swine

Further details on the above projects can be found at the University website at: http://oasis.uoguelph.ca

1998 NON - RESEARCH RECOMMENDATIONS

TO OMAFRA

Extension is no longer a priority of faculty at the university which leads to the problem of the dissemination of this information. The Agricultural and Rural Division has been reorganising the swine extension service for the past 2 years which has created an unsettled feeling among producers and many staff. The new leads are to "enhance technology transfer to the pork industry by reviewing research findings and industry developments, participate in industry developments and facilitate the preparation and rapid transfer of information on new technologies to the Ontario pork sector". It is important that this group has the resources to provide the link between researchers from Ontario and from around the world to the Ontario pork sector. The communication link must also be developed from the new Ontario pork sector to the researchers for current concerns of the industry.

The Ontario pork sector is changing rapidly. Research is being done by many in the feed, genetics

and pharmaceutical industries. Producers have access to information through the Internet and by travelling to conferences world-wide. The latest production information is more readily available than in the past. While the " how to " will remain important, there needs to be increased emphasis on the philosophical and social aspects of pork production in Ontario not only to producers but more importantly to pork consumers.

Response
***Omafra* - Agriculture & Rural Division**

The re-organization of the Agricultural and Rural Division of the Ontario Ministry of Agriculture, Food and Rural Affairs, as recommended in the Agricultural and Rural Advisory Services Study, has been completed. Staff located at 35 local offices provide the first line of contact for clients wanting to access various OMAFRA services. Three regional swine specialists, strategically located across the province, provide technology transfer and advisory services to clients in their assigned areas. Three provincial program leads, in the areas of swine nutrition, pork quality assurance and swine production systems, interact with research and industry personnel to develop leading edge technology transfer programs and information packages for use by ministry staff, industry and producers. Other staff specializing in swine production provide information and services in swine health management, engineering, animal care and business management. The group of staff providing services specifically to the Ontario swine industry is known as the Swine Advisory Team (SWAT).

Members of the SWAT team have access to research and industry resources through technical magazines, scientific journals and the use of the Internet. They have contact with swine researchers and industry leaders across Canada and the United States, as well as some off shore countries. The members have one formal meeting and numerous other opportunities to meet with directors of Ontario Pork to discuss industry trends and issues and to formulate plans for awareness, extension and technology transfer initiatives. SWAT team members represent the ministry on the Ontario Agricultural Services Coordinating Committee and Ontario Pork Research committees. Staff attend educational meetings and seminars in Canada and the United States to receive information on scientific research, industry developments and new ways of delivering educational programs.

In addition to the needs of the pork industry for information on research and technical innovations, SWAT team members also recognize the importance of the well being of the individuals involved in swine production. During the recent "price depression " that hit the hog/pork industry in Ontario, the SWAT team and a few other staff members initiated a Pork Industry Help Line that producers and others in the industry could access on a 24 hour basis to get production information and references to services that could be accessed by individuals undergoing financial and mental stress due to low market prices.

The subcommittee recommendation specifically mentions the need to emphasize the philosophical and social aspects of pork production to pork consumers. Members of the SWAT team are very supportive of the efforts of Ontario Pork and the Ontario Farm Animal Council in providing consumers with accurate information on the management practices involved in modern swine production and marketing. Participation at the Ontario Pork exhibit at the Royal Winter Fair and

the ongoing commitment to make producers and consumers aware of the Code of Practice for the Care and Handling of Pigs help develop a more positive image of pork production in Ontario.

1999 RESEARCH & SERVICES RECOMMENDATIONS

PROPOSAL #1
TO U of G, AAFC, PSC, OMAFRA-ENC, OP, OPIC, CPC

To focus research on Environmental Issues - Indoor and Outdoor - and develop systems which reduce environmental impact as well as improve the performance, health, safety and comfort of pigs; and health and safety of operators.

BACKGROUND

Concern is growing in Ontario and world-wide as to the effect swine production has on the air, water and soil. This will accelerate as the move to larger operations leads to a greater potential for pollution related to storing and spreading of manure. Further, society has a growing concern for the welfare of the pigs as well as to the long-term health of the operators of these facilities. Nutrient Management Plans and MDS guidelines have been put together based on the best information available. Although these are important steps forward they are not scientifically based in all areas. The industry must set the guidelines based on science and facts.

OBJECTIVES

1. To evaluate the impact that swine production has on the environment in the areas of alternative manure storage, manure application, disposal (value added), and its effect on soil and water pollution.

2. To look for technology (i.e. transgenic pigs) that will reduce any negative impact of swine production through: the reduction or balancing of the nutrient content of the feed, improved feed utilization and reducing odour associated with swine manure.

3. To test methods and instrumentation for the assessment of odours from swine operations and to use these methods to evaluate various swine barn and ventilation systems such as: tunnel ventilation vs. side wall fans vs. roof fans; under barn storage vs. open top concrete tanks vs. earthen storages dry vs. liquid manure systems.

4. To determine the optimum siting of swine barns for odour management, disease transmission and the acceptance by the community.

5. To evaluate the safety risk to pigs and people associated with manure removal in various styles of swine barns. Specific projects would include: gas hazard potential of different types of swine barns. The popularity of under barn storage has generated new styles of finishing barns some of which avoid in barn agitation of

manure and may be less hazardous. These need to be tested. Development of a low cost alarm system to warn of high levels of hydrogen sulphide when cleaning out a barn. To develop an attachment mounted to the manure pump which would close of the pumpout port of in barn storages. The objective would be to restrict air from entering the pit and potentially gassing the pigs.

6. To develop a scientific basis to support recommendations and guideline . This is needed if the pork industry is going to survive and attract the levels of investment required to sustain a viable industry in Ontario. If the industry does not get involved in setting the guidelines based on scientific facts, a judge will decide in a court room based on perception and what he sees.

PROPOSAL # 2
TO U. of G., AAFC, OPRC

To utilize and develop biotechnology to enhance the performance of the pork industry.

BACKGROUND

Biotechnology is the most powerful emerging technology of our time. Decoding the genetic information that drives life processes in all living things _microbes, plants, animals (pigs), humans _unlocks the door to unparalleled (economic) opportunities Specific opportunities visualized are the following:

1. Microbial control of biological waste (manure) should be researched so as to influence the odours and detrimental products from swine manures.

2. The pork industry should be lead to develop to more fully suit human needs. No longer do we need to be constrained by the deficiencies of the pig. Biotechnology research should be undertaken in the following areas: novel pork products; higher nutritional value pork; superior growth rates and feed efficiency; superior reproductive performance.

3. Sustainable pig health care through revolutionary approaches to: Diagnosis; prevention of disease; treatment of disease.

OBJECTIVES

1. To apply transgenic methodology for the introduction of genetic traits into pigs to modify specific characteristics (SOD and PHY Genes).

2. To continue to develop genetic markers for rapid advances of desirable traits in the pig.

3. To commence genome research which represents a very active area of biological discovery. Scientist are encouraged to become active and leverage the global scientific community to enhance pork production.

PROPOSAL # 3
TO U OF G, AAFC OMAFRA, OPRC

Alternatives to the sub-therapeutic use of anti-microbials in swine feed. Mathematical modeling of swine, growth and development and continued investigation of methods to reduce the incidence of mycotoxins in swine diets.

BACKGROUND

The demand for residue-free product will continue to be an issue in the export and domestic sales of Ontario swine products. The use of sub-therapeutic levels of anti-microbials (as growth promotants) is a concern to the general public in Ontario as it relates to food safety. The use of anti-microbials in feed is being increasingly limited in Europe and other areas of the world. Research is required in order that Ontario producers can compete economically in a system that minimizes or limits the use of sub-therapeutic anti-microbials in feed.

Feed accounts for 60_65% of the total cost of producing a market hog and offers major opportunities for improving profitability. To remain competitive swine diets must be continually updated to keep pace with improvements in animal performance. Technologies such as segregated early weaning and three site production systems are being adopted by the Ontario pork industry and are leading to unprecedented improvements in health status and growth performance. In addition, genetic improvement and growth promotants continue to improve lean tissue growth rates of swine. The combined effect of these advancements is to increase the complexity of predicting the nutrient requirements of swine. There is an immediate need to expand and apply existing swine growth simulation models through basic and applied research and make them available to the industry. Models are the only effective tool to develop the optimum feeding and management strategies for individual pig units. Models can also be used to identify means to reduce the excretion of excessive nutrient intake in pig manure addressing an environmental concern.

Swine producers in Ontario continue to suffer losses due to mycotoxin contamination of corn and wheat. These losses result from feed refusal and disruptions of breeding herds. Recently, significant advances have been made in the control of some mycotoxins. Current research efforts at the University of Guelph merit continued support given the potential negative impact mycotoxins could have on pig performance and financial viability. Research to develop fusarium/mould resistant corn needs to be supported. (GMO not priority)

Liquid feeding systems are becoming more prevalent in Ontario. Most of the information and research is from Europe and is not applicable to the Ontario situation (differing feedstuffs, genetics, temperatures etc.).

OBJECTIVES

1. To investigate alternatives to the use of sub-therapeutic levels of anti-microbials in feed, which will maximize profits in finishing barns.

2. To evaluate the nutrient requirements of swine using a factorial (modeling) approach. Emphasis should be placed on effects of health status, immune system stimulation, genotype, environment and their interactions on growth and development and predicted nutrient requirements of starter pigs, grow-finish pigs and sows. Models could be used to determine the strategy needed to feed a specific group of pigs to their genetic and environmental potential as economically as possible.

3. To develop methods to reduce the adverse effects of mycotoxins on swine.

4. To develop fusarium resistant corn.

5. To develop specific recommendations for liquid feeding in Ontario.

PROPOSAL #4
TO U OF G, AAFC, OPRC, CMRI

To improve pork safety and quality, thus enhancing consumer confidence and acceptance of pork and pork products

BACKGROUND

Consumers are concerned about the safety of food. Perception becomes reality on this subject. Competitors are promoting pork products from production systems focused on pathogen monitoring and minimisation of anti-microbial use.

Specific concerns are contamination of food with pathogenic or spoilage micro-organisms or industrial and agricultural chemicals which could result in food poisoning. Research is needed to determine the extent of and the reasons for the various types of contamination and how these can be prevented. Because knowledge about controlling these contamination sources is least developed as it applies to pre-slaughter handling and production, extension efforts directed at developing effective on-farm HACCP programs and strategies is needed. As a control measure to ensure the integrity of pork products and protect both domestic and export markets, development of quick and reliable on-site tests for the detection of microbial agents and chemical contaminants in pork are needed.

A growing area of concern is the possible development of anti-microbial resistant bacteria. Research is needed to study the effects of anti-microbial use as it relates to food safety and develop alternative strategies or systems. Developments in human medicine and possible use of pig-derived transplant parts produces a new area of risk for the development of unidentified and potentially

very serious new health risks associated with pork production.

Backfat levels in pork carcasses continue to be reduced through improved genetics, nutrition and management. This has been accompanied by a decrease in intramuscular fat with reductions in flavour, juiciness and to some extent tenderness. Research is needed to determine how we can reduce fatness while maintaining the eating quality of pork. There is also a need to determine ways of altering fat distribution on carcasses to satisfy demands for specific products and to be capable of tailoring genotypes and production systems to these specific demands.

Product consistency for pork products is becoming more critical in meeting consumer demand. Reducing variability in the delivered product will be important in gaining market share for pork products both domestically and in export markets. Research is needed in the area of variability within genotypes as it relates to meat quality and consistency.

A variety of new alternative feedstuffs, derived from the consumer and food manufacturing sector are available for swine. The quality, variety and demand for these products has increased dramatically in the past few years. There are risks associated with the use of some of these products, particularly in the area of carcass composition, meat quality and consumer acceptance. These alternative feeds need to be classified with respect to human and animal safety, nutritional value and effect on meat quality. Satisfactory inclusion levels and the additive effects of combinations of flavours and different fatty acids should be evaluated before these products are utilized in swine feeding programs. Consumer satisfaction unrelated to the issue of opportunity feeds is becoming a differentiating factor in the marketing of pork products. Research should be directed toward development of knowledge about sensory characteristics of pork and their adjustment.

PSE (pale, soft, exudative) pork remains a serious problem in the Canadian pork industry. PSE is responsible for direct financial losses domestically and reduced sales internationally. The discovery of the PSS gene and the subsequent efforts to eliminate it from the pork population will **not eliminate PSE pork**. Research is still needed on how to reduce the impact of current marketing, transportation and slaughter practices on the development of PSE in pork as well as on the welfare of the pig.

OBJECTIVES

1 Study the impact and control of food borne disease agents. Develop strategies for low or zero anti-microbial product use in swine production. Develop emergency systems for monitoring and controlling specific disease organisms which have the potential for developing into public health or food safety issues. One example of this topic area from another species is the agent responsible for BSE in Cattle.

2. Research and identify effective hog tracking and identification systems that will allow sorting of hogs based on their respective production system and genetic type.

3. Determine the impact of new opportunity feeds on pork quality, including oxidative stability and taste, safety and consumer acceptance. Include nutritional and

processing guidelines for the safe and effective use of each specific product. Continue the development of quantification and control measures for factors in meat that affect the taste and consumer acceptance of pork products.

4. Develop technology for the prediction of meat quality for measurements taken on the live pig to support both genetic and management decisions leading to an overall increase in pork quality. Develop a comprehensive carcass grading and evaluation system that incorporates measures of pork quality including the distribution of muscle and lean and the quantitative measures of yield. Systems should be to provide means for genetic improvement in specific meat quality related characteristics and in their variability of expression. Determine and evaluate the relative important of the factors responsible for the wide variation in composition of pork carcasses and develop production systems to produce more uniform carcasses.

5. Continue the development of methods and systems for detection, control and reduction of the following in pigs and pork products:
   a) quality defects such as PSE
   b) drug residues and other contaminants
   c) pathogens and spoilage micro-organisms

PROPOSAL #5
TO U of G, AAFC, OPRC,

To conduct research in order to improve health and productivity of Ontario swine

BACKGROUND

Strategies for reducing the prevalence of disease in swine herds have been employed by many Ontario pork producers. Depopulation and repopulation with minimal disease animals, strategic medication to eliminate specific diseases, and all-in/all-out management systems are examples of common techniques that are being used to create a better health status for Ontario pigs. Another important aspect of these strategies is that antibiotic use can be reduced and thus the risk of residues and the development of antibiotic resistance may be reduced.

As a result of these and other changes to the Ontario swine industry, the emphasis placed on infectious disease research needs to be shifted from the treatment and control of traditionally important diseases to studying health security and disease monitoring. There are diseases that are now emerging as important problems under these management systems. These diseases include Porcine Reproduction and Respiratory Syndrome (PRRS), Streptococcus meningitis, Mycoplasma infections, and Glasser's Disease. Recently, post-weaning colibacillosis has become a significant problem and requires investigation. New diseases continue to arise. Post-weaning Multi-systemic Wasting Syndrome (PMWS) has been identified as a possible cause of economic loss in Ontario nurseries.

OBJECTIVES

1. To investigate the negative effect of subclinical disease and immune stimulation on growth performance and to study means by which losses in growth performance can be reduced. In particular, work needs to be directed at reducing the growth variability caused by disease.

2. To investigate methods of eradicating or controlling infectious diseases and methods of monitoring to ensure herds remain free of specific diseases. As well, methods of reducing the use of antibiotics and reducing the risks of antibiotic residues and the development of antibiotic resistance need to be investigated.

3. To investigate disease spread from herd to herd and within herds. This work should include studies dealing with the development of immunity in herds particularly when production stages are separated.

4. To continue to do research on economically important infectious diseases to better understand pathogenesis, epidemiology, and control strategies. Particularly work needs to be carried out on newly emerging problems such as Colibacillosis and Post-weaning Multi-systemic Wasting Syndrome.

PROPOSAL #6
TO U of G, AAFC, OPRC

To conduct research into improving reproductive efficiency and increasing perinatal survival

BACKGROUND

There has been a rapid acceptance of artificial insemination in the Ontario swine industry resulting in an increased need for research in this emerging technology. A trend toward earlier weaning ages has caused a need to study the effects of short lactation length on reproductive performance.

Another development in the industry is to all-in/all-out management of nurseries and grower-finisher facilities. This has led to the use of batch farrowing on certain farms. There is a need to examine techniques for synchronising estrus, possibly through hormone manipulation., to assist producers using batch farrowing systems, but also to help maintain pig flow on weekly farrowing units as well.

The economic importance of predictable and controlled reproductive performance can be measured in pigs produced and physical resource utilization. The potential for improvement in litter size, farrowing rate, and early puberty is great.

OBJECTIVES

1. To investigate the physiology of the boar including means of improving AI, semen quality, and management factors associated with breeding.

2. To investigate factors associated with early embryo viability with the view of reducing embryo mortality and exploring more feasible methods of embryo transfer.

3. To investigate the physiological environmental and disease factors associated with parturition and neonatal viability including lactation failure.

4. To investigate methods of improved control of the female reproductive cycle to allow producers better utilization of facilities and better pig flow.

PROPOSAL #7
TO U of G, AAFC CARC - AWC, OPRC

To continue research on pig behaviour to improve the productivity and well-being of pigs.

BACKGROUND

It is recognized that behavioural problems impose major constraints on productivity of domestic livestock. With pigs, problems include inadequate nursing behaviour leading to starvation piglets, crushing of piglets by the sow, inadequate feed intake by newly weaned pigs, and poor mating performance by boars.

Also, there are the detrimental effects of aversive behaviour such as bullying, fighting when pigs are regrouped, and "vices". There are also continued expressions of concern over the well being of pigs in modern pig production. Behavioural research should help resolve the controversies ` generated.

Shipping and slaughter of pigs creates concerns about welfare. Because of the substantial movements of pigs from the farm gate to the point of slaughter, pigs are subjected to significant handling, mixing and areas previously not exposed to. Some management and handling research is needed to examine was to predispose the pigs to various changes in their environment.

OBJECTIVES

1. To develop methods of measuring stress and applying these methods towards the reduction of stress in pig product.

2. To better understand the social and aggressive behaviour of swine to reduce the detrimental effects of regrouping, bullying, and excessive competition for food. In particular, to study farrowing and post weaning behaviour and the causes of inadequate nursing behaviour and post-weaning feed intake.

3. To identify the social and physical environment leading to vices such as tail-biting, ear-chewing, cannibalism and inappropriate dunging/urinating patterns and to devise

penning, feeding and management practices that minimizes the occurrence of these vices.

4. To examine the behaviour and physiological response of pigs in different management/housing systems.

5. To explore management practices that would better prepare pigs for the handling, transportation and penning in arrange barns of pigs to prepare them for a less stressful journey to the packing plant.

PROPOSAL # 8 (A recommendation brought forward this year and directed to Economics Committee - to be dealt with more thoroughly next year)

TO U of G, OPRC, OMAFRA, EC

Market access and marketing strategies.

BACKGROUND

Changes in the swine industry have led to frustration and uncertainty among many Ontario hog producers. New contract options have increased the number and complexity of decisions that producers need to make. Much of the advice available to producers is based on opinion rather than evidence. Producers need information of higher quality to help them make complex decisions, particularly during difficult financial times such as many are facing now. In addition, packers need assurance of supply and quality, and need information on which to base decisions concerning their supply chain, such as contracting through OPPMB or focusing on direct contracts. This recommendation should be directed towards the Economic Committee of the Ontario Agriculture Research and Services Committee. The proper positioning of this proposal will receive more attention in the major report next year.

OBJECTIVES

1. To study the advantages and disadvantages of those features of swine production operations that contribute to efficiency, profitability, and access to the marketplace; for example, economies of scale and type or quality of product.

2. To study contract and other options available to producers using historical and projected market trends, and to evaluate the consequences of different marketing strategies for a variety of operation types (e.g. size of operation).

3. To study how these issues relate to packer supply needs.

NON RESEARCH RECOMMENDATIONS

TO OMAFRA, OPIC, PSC

The Agricultural and Rural Division has been reorganizing the swine extension service for the past 3 years which has created an unsettled feeling among producers and many staff. The new leads are to "enhance technology transfer to the pork industry by reviewing research findings and industry developments, participate in industry developments and facilitate the preparation and rapid transfer of information on new technologies to the Ontario pork sector". It is important that this group has the resources to provide the link between researchers from Ontario and from around the world to the Ontario pork sector. The communication link must also be developed from the new Ontario pork sector to the researchers for current concerns of the industry.

Implement effective pre-slaughter HACCP programs and the systems to respond to new challenges to the effectiveness of these programs that can be implemented across the production industry.

The Ontario pork sector is changing rapidly. Research is being done by many in the feed, genetics and pharmaceutical industries. Producers have access to information through the Internet and by travelling to conferences world wide. The latest production information is more readily available than in the past. While the " how to " will remain important, there needs to be increased emphasis on the philosophical and social aspects of pork production in Ontario not only to producers but more importantly to pork consumers.

Summary of Distribution of Recommendations

RESEARCH PROPOSAL	PRIORITY	U of G	AAFC	OPRC	PSC	EV	EC	AWC	CMRI	OPIC	OMAFRA	FSC	CPC	CARC
Environment	1	X	X	X	X	X					X		X	
Biotechnology	1	X	X	X										
Nutrition	2	X	X	X	X									
Pork Quality	1	X	X	X					X			X		X
Health	2	X		X										
Reproduction	2	X	X	X										
Behaviour	2	X	X	X	X			X						X
Marketing	1	X		X			X				X			
Services	1				X					X	X			

1 = high priority 2 = medium priority 3 = low priority

U of G	=	University of Guelph
AAFC	=	Agriculture and Agri-Food Canada
OPRC	=	Ontario Pork Research Committee
OPIC	=	Ontario Pork Information Centre
PSC	=	Prairie Swine Centre
OMAFRA	=	Ontario Ministry of Agriculture, Food and Rural Affairs
CARC	=	Canadian Agriculture Research Committee
CPC	=	Canadian Pork Council
EV – OARSC	=	Environment Committee
EC – OARSC	=	Economic Committee
AWC	=	Canadian Animal Welfare Committee
CMRI	=	Canadian Meat Research Institution
FSC – CARC	=	Food Safety Committee

1999 ONTARIO PORK RESEARCH COMMITTEE MEMBERSHIP

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APPENDIX 1 SIGNIFICANT RESEARCH ACCOMPLISHMENT

University of Guelph develops a transgenic phytate digesting pig - "Enviropig"

ACCOMPLISHMENT

Researchers Dr. Cecil Forsburg and Dr. Pillips and their colleges from the University of Guelph created a transgenic pig that contains a gene that produces phytase. Phytase which will be in the saliva of the pig releases organic phosphorus from plant material in the digestive system so that phytin phosphorus is better utilized. The trade name for these pigs so derived is "ENVIROPIG."

There has been genetically modified plants and animals for some time but the "Enviropig" is the first animal engineered to assist with an environmental problem.

Why Was The Work Done?

The Enviropig was developed as an economical and environmentally responsible way to reduce the added elemental phosphorus in the feed and through better utilization of the phytin phosphorus in the plant component of feeds, less phosphorus is eliminated in the manure. In other words the transgenic pig produces manure that is more environmentally friendly.

Potential Economic Impact

The potential for economic benefits to Ontario Agriculture is in the millions of dollars. The University is working with Ontario Pork with respect to the development, promotion and marketing of the transgenic pig. The trade name for the pig is "ENVIROPIG". The Enviropig comes at a very opportune time for world_wide markets where there is concern about the amount of phosphorus being added to the environment from animal sources. .

APPENDIX 2

DUTIES AND TERMS OF REFERENCE OF COMMITTEE

1. To review pork research and service being carried out in Ontario.

2. To disclose problems that face the pork industry and that which require investigation.

3. To assess the relevance of research and service programs and suggest priorities for new research programs, and to recommend what programs under way should be continued, expanded or terminated.

4. To estimate the cost involved to conduct research and service programs and to supply cost-benefit information if possible.

5. To supply this information in written reports to the OARSC.

6.T o function through an animal species chairperson who will be appointed through OARSC. The appointment of the chairman will be for 4 years. He or she will not succeed themselves but may serve an additional 4 year period with at least a 4 year absence in between each period.

APPPENDIX 3 PORK RESEARCH (ICAR DATA BASE)

Establishment: AGRICULTURE AND AGRI-FOOD CANADA, RESEARCH BRANCH, DAIRY AND SWINE RESEARCH AND DEVELOPMENT CENTRE
P.O. Box 90, 2000 Route 108 East
Lennoxville, Quebec, J1M 1Z3

Title: *Développement de régies et biotechnologies simples et économiques afin de valoriser leseffluents d'élevage et d'industries agroalimentaires et de réduire leurs impacts sur les environnements humains et physiques.* Development of simple, cost-effective herd management systems and biotechnologies for reusing effluent from animal production and agri-food industries and for reducing its impact on human and physical environments.

Objectives: *Développer un procédé de digestion anaérobie en milieu psychrophile (10 à 20 C) dans un bioréacteur à opérations séquentielles pour désodoriser. Complètement le lisier de porc, optimiser sa valorisation agronomique, réduire ses impacts négatifs sur la qualité de l'air, des sols et des eaux de surface et souterraines et finalement réduire ses émissions de gaz à effet de serre. Développer et appliquer des biotechnologies environnementales pour traiter d'autres types d'effluents d'élevage ou d'industries agroalimentaires (ex. eaux usées d'abattoir).* To develop a process of anaerobic digestion under psychrophilic conditions (10 to 20 C) in a sequential batch bioreactor to completely deodorize liquid swine manure, optimize its recovery and reuse in agriculture, reduce its negative impact on the quality of air, soil surface water and groundwater and reduce greenhouse gas emissions. To develop and apply environmental biotechnology to treat other types of effluent from livestock production or agri-food industries (e.g., abattoir wastewater).

Study Leader:	MASSÉ D		
Start Date:	01/05/1992	**Expected End Date:**	31/12/2001
Study Number:	326-1331-9702		

Title: *Identification et utilisation des marqueurs moléculaires pour améliorer la génétique porcine au Canada.* Identification and use of molecular markers to improve swine genetics in Canada.

Objectives: *Identification de gènes marqueurs ou candidats ayant une influence sur différents caractères de production chez le porc (ex. croissance, qualité de la viande, prolificité, mortalité embryonnaire), dans le but d'améliorer la génétique porcine,*

au moyen de la sélection assistée de marqueurs moléculaires. Identification of gene markers or candidate genes that have an influence on various swine production traits (e.g., growth, meat quality, prolificacy, embryo mortality), with the objective of improving swine genetics through the use of molecular marker assisted selection.

Study Leader: PALIN M F
Start Date: 05/01/1998 **Expected End Date:** 30/04/2003
Study Number: 326-1331-9705

Title: *Influence des cytokines sur la prolificité, la croissance et la réponse immunitaire chez le porc.* Influence of cytokines on prolificacy, growth and immune response in swine.

Objectives: *Etudier et caractériser l'influence des cytokines sur la prolificité, la croissance et la réponse immunitaire chez le porc dans le but d'augmenter la productivité des élevages.* To study and characterize the effect of cytokines on prolificacy, growth and immune response in swine with the objective of increasing herd productivity.

Study Leader: LESSARD M
Start Date: 04/01/1998 **Expected End Date:** 28/03/2003
Study Number: 326-1331-9804

Title: Development of molecular and quantitative methodologies for the application of marker-assisted selection to swine breeding

Objectives: By 2008, to investigate and to identify highly polymorphic microsatellite markers in the genomic DNA and to use mitochondrial DNA D-loop sequence variation as a means of mapping economically important traits, and to employ this information to develop breeding strategies in the production of crossbred market hogs.

Study Leader: SHRESTHA J N B
Start Date: 31/03/1998 **Expected End Date:** 31/03/2000
Study Number: 326-1331-9808

Title: Environmental waste management.

Objectives: The objective is to recycle and improve management of farm, domestic and industrial wastes and fertilizers with less soil,water and air pollution. The projects involve treatment, storage, transformation, evaluation, new product development, and/or land application of industrial wastes, by-products, and products (animal and other farm, industry, fertilizers), with an emphasis on nutrient balance and availability.

Study Leader: BARNETT G M
Start Date: 06/01/1998 **Expected End Date:** 31/07/2003
Study Number: 326-1331-9807

Title: *Développement d'une méthode de régie de la truie impliquant des facteurs hormonaux et environnementaux, afin d'augmenter la production laitière de la truie & par conséquent augmenter le poids & la vigueur des porcelets au sevrage.* Development of a sow herd management system involving hormonal and environmental factors, to increase sow milk production and thereby increase the weight and vigour of weanlings

Objectives: *Mesurer l'effet de la prolactine et/ou de divers facteurs hormonaux ainsi que l'effet de facteurs environnementaux sur la prise alimentaire, le comportement maternel et la production laitière de la truie ainsi que sur la croissance et le comportement des porcelets.* To measure the effect of prolactin and/or various hormonal factors as well as the effects of environmental factors on feed intake, maternal behaviour and milk production in sows and on piglet growth and behaviour.

Study Leader: FARMER C
Start Date: 01/01/1996 **Expected End Date:** 01/01/2001
Study Number: 326-1331-9602

Title: *Impact éthologique, zootechnique, économique et environnemental d'une alimentation à haute teneur en fibres chez la truie en gestation.* Ethological, zootechnical, economical and environmental impact of a high fibre diet on gestating sows.

Objectives: *Déterminer en concertation avec l'industrie, les meilleurs sources de sous-produits fibreux d'un point de vue économique et environnemental et établir le taux d'incorporation optimal dans les rations de truies en gestation et en fonction de la capacité des rations à réduire la faim et à améliorer la productivité ainsi que de leur coût et des propriétés physiques et chimiques du lisier produit* To determine, in cooperation with industry, the best sources of fibrous by-products from an economic and environmental perspective and to establish the rate of optimal incorporation in gestation rations as a function of the capacity of the rations to reduce hunger and improve productivity as well as their cost and the physical and chemical properties of the liquid manure produced.

Study Leader: ROBERT S
Start Date: 01/01/1996 **Expected End Date:** 01/01/2001
Study Number: 326-1331-9603

Title: *Importance de certaines vitamines du complexe B dans la nutrition et la reproduction chez le porc.* Importance of certain B-complex vitamins in swine nutrition and reproduction.

Objectives: *Etudier et evaluer les besoins en acide folique, en pyridoxine et en riboflavine chez le porc en relation avec leur utilisation metabolique et leurs roles dans la reproduction et le metabolisme proteique et energetique.* To study and evaluate

folic acid, pyridoxine and riboflavin requirements of swine in relationship to their metabolic use and their roles in reproduction and protein and energy metabolism.

Study Leader: MATTE J
Start Date: 30/10/1995 **Expected End Date:** 31/12/1998
Study Number: 326-1331-9604

Title: Développement d'une méthodologie d'optimisation permettant d'améliorer simultanément le rendement économique et écologique des systèmes de production de porc à l'engrais à l'aide de la modélisation mathématique sur ordinateur. Development of an optimization method to simultaneously improve economic and ecological performance of feeder pig production systems with the help of computerized mathematical models.

Objectives: *Développer des méthodes d'alimentation et de régie permettant d'optimiser les systèmes de production porcine du point de vue biologique (croissance corporelle, composition de la carcasse, etc.), économique (revenu net, etc.) et environnemental (lisier produit, azote inorganique, etc.).* To develop feeding and herd management methods designed to optimize swine production systems in terms of biological (body growth, carcass composition, etc.), economic (net revenue, etc.) and environmental considerations (manure produced, inorganic nitrogen, etc.).

Study Leader: POMAR GOMA C
Start Date: 01/04/1993 **Expected End Date:** 31/03/1998
Study Number: 326-1331-9611

ICAR - 1998- IRAC

ESTABLISHMENT: **AGRICULTURE AND AGRI-FOOD CANADA, RESEARCH BRANCH, BRANDON RESEARCH CENTRE**
18th Street and Valley Road, P.O. Box 1000A, R.R.#3
Brandon, Manitoba, R7A 5Y3

Title: Development of new technologies for minimization of nutrient excretion losses and odours in swine manure, and enhancement of its utilization for alternative uses and soil fertility.

Objectives: To develop new swine manure management technologies for 1) minimization of nutrient (nitrogen, phosphorus and other minerals) excretion losses and odours in swine manure through balanced feeding programs in terms of optimum dietary ideal protein amino acid ratios, energy and other nutrient requirements including feed enzymes and additives and 2) enhancement of swine manure utilization for alternative uses and soil fertility.

Study Leader: GRANDHI R R
Start Date: 01/04/1997 **Expected End Date:** 31/03/2000
Study Number: 360-1113-9702

ICAR - 1998- IRAC
Charlottetown

Establishment: **AGRICULTURE AND AGRI-FOOD CANADA, RESEARCH BRANCH, CROPS AND LIVESTOCK RESEARCH CENTRE**
440 University Avenue, P.O. Box 1210
Charlottetown, Prince Edward Island, C1A 7M8

Title: Manure application strategies for environmental safety and efficient crop production.

Objectives: To examine the effect of manure application strategies on environmental safety and efficient crop production.

Study Leader: CAMPBELL A J
Start Date: 01/05/1991 **Expected End Date:** 01/05/1998
Study Number: 303-1113-9101

Title: Nutrition and management of growing pigs.

Objectives: To provide new information and technology that will increase the efficiency of pork production in the Atlantic Region.

Study Leader: VANLUNEN T A
Start Date: 01/11/1994 **Expected End Date:** 01/11/1996**
Study Number: 303-1212-9501

**The end date of this study should be 2001.

ICAR - 1998- IRAC

Establishment: **AGRICULTURE AND AGRI-FOOD CANADA, RESEARCH BRANCH, LACOMBE RESEARCH CENTRE**
Lacombe, Alberta, T0C 1S0

Title: Antimicrobial strategies to improve the safety and extend the storage life of meat

Objectives: To study approaches to control the incidence and growth of pathogenic and spoilage bacteria on raw meat destined for overseas markets and for local distribution including:

1.D evelopment and evaluation of physical decontamination methods
2.E valuation of the inhibitory properties of the natural microbial population of meats and their use
3.E valuation and improvement of the effectiveness of antimicrobial substances on bacteria of meatborne origin in model systems and on the natural population of commercial meats.
4.Sen sitization of bacteria to action of antimicrobial treatments.
5.A pplication and implementation of innovative packaging technology to facilitate distribution and merchandising of meat and meat products in domestic and export markets.
6.De velopment of methods to determine numbers of pathogens on raw meats.

Study Leader: NATTRESS F M
Start Date: 01/06/1998 **Expected End Date:** 31/05/2003
Study Number: 385-1411-9807

Title: HACCP Implementation and Quality Management: Prevention of contamination with and growth of pathogens and spoilage bacteria during meat processing and and distribution.

Objectives: 1.T o identify operations in commercial dressing processes for beef, pig and sheep carcasses which result in carcasses being contaminated with Escherichia coli; to compare dressing processes for the identification of hygienically superior practices; and to verify the efficacy of hygienically superior practices through their implementation in hygienically inferior processes.
2.T o develop microbiological procedures for identifying the hygienic condition of cleaned equipment. To develop procedures and apparatus for effective, routine cleaning of items of meat plant equipment which are currently cleaned inadequately.
3.T o determine the temperatures of meat undergoing cooling, storage, transport and display in commercial processes. To assess the effects of commercial temperature regimes upon the microbiological safety and storage stability of meat. To identify procedures for monitoring and verifying the control of product temperatures. To developprocedures and equipment for improving the control of product temperatures.
4.T o determine the impact of the raw meat processing and storage conditions in the retail environment upon bacterial contamination and growth, quality deterioration and case life with a view to developing procedures to enable meat merchandisers to reduce spoilage losses and improve the safety of consumer-ready meats.

Study Leader: GILL C
Start Date: 01/06/1998 **Expected End Date:** 31/05/2003
Study Number: 385-1411-9806

Title: Identification of molecular markers for improving meat and carcass quality traits

Objectives: Apply molecular biological techniques towards the improvement of meat quality and safety.

Study Leader: MEADUS W J
Start Date: 01/06/1998 **Expected End Date:** 31/05/2003
Study Number: 385-1411-9801

Title: Antemortem management of livestock stress, meat yield and quality

Objectives:

Study Leader: SCHAEFER A L
Start Date: 01/06/1998 **Expected End Date:** 31/05/2003
Study Number: 385-1411-9802

Title: Postmortem evaluation and control of the variation in composition and quality of carcasses and meat

Objectives: To evaluate and control the variation in composition and quality of carcasses and meat through:

1.D evelopment and evaluation of methods for determining meat quality.
2.D evelopment and assessment of new processing techniques or technologies for improving and/or controlling variability in meat quality.
3.S tudying and manipulating the underlying biochemical contributors to meat quality.
4.E valuating carcass composition and meat quality in support of ante-mortem treatments.
5.Co llection of an ongoing database on variability in carcass composition and meat quality.

Study Leader: AALHUS J L
Start Date: 01/06/1998 **Expected End Date:** 31/05/2003
Study Number: 385-1411-9803

Title: Development and assessment of methodologies and instrumentation for the estimation of carcass yield and grade.

Objectives: 1.T o develop methodology and instrumentation for estimation of carcass yield and quality grade.
2.T o evaluate currently available and newly emerging technologies for their ability to estimate carcass yield and/or assess quality grade factors.

Study Leader: ROBERTSON W M
Start Date: 01/06/1998 **Expected End Date:** 31/05/2003
Study Number: 385-1411-9804

Title: Factors affecting the palatability of meat.

Objectives: By 2003, assess the influences of various genetic, production, processing, packaging, distribution, and merchandising factors on the palatability and consumer acceptance of meat and meat products.

Study Leader: JEREMIAH L E
Start Date: 01/06/1998 **Expected End Date:** 31/05/2003
Study Number: 385-1411-9805

ONTARIO SHEEP RESEARCH AND SERVICES COMMITTEE

EXECUTIVE SUMMARY

The sheep industry continues to strengthen in terms of productivity. Numbers are starting to increase and if slaughter prices remain strong, it is expected that there will continue to be an increasing number of larger flocks. OLIBS has influenced the industry by escalating the awareness of the need for improved health and genetics. Ewe lamb replacement values have continued to remain above slaughter values. Other initiatives such as on-farm QA and HACCP programs, Forward Contracting, integrated predator management and provincial flock health programs are all going to influence the industry and move it forward. However, the industry still requires assistance, particularly research results which are now being produced by this active program and extension assistance with nutrition, genetic improvement, disease control, product (meat and milk) quality and predation control to ensure the successful implementation of the above initiatives. This document outlines those needs in detail.

INTRODUCTION

The OLIBS study continues to occupy most of the OMAFRA sheep research effort. The ARIO accepted the OMAFRA - University of Guelph Research Agreement report presented in October 1997 and voted to continue funding of this program. Important, long-term initiatives undertaken by OSMA that are still developing are the co-ordination of forward contracting and involvement with the development of an on-farm Quality Assurance program. The forward contract program is continuing to develop with the contract now demanding 100 lambs per week on a year around basis.

The OLIBS program is progressing well. The flock health program has been developed for Ontario. Level One has been implemented and promotes best health management practices, monitoring and goal setting for productivity and will blend with the Quality Assurance program being developed by OSMA. Level Two will start with Maedi Visna and will hopefully soon include Johne's disease and scrapie (depending on the federal government and the Canadian Sheep Federation).

The reproductive technologies group is winding down the production of "OLIBS" sheep. Approximately 200 breeding ewes are now at one Replicator producer and approximately 100 OLIBS ewes will be sent to the New Liskeard Research Station this fall to repopulate their flock. The purebred group is active in developing sire-referencing schemes to improve genetics within the Rideau and Dorset breeds. The Rideau group has opened the program out to the breed association, an example of how the OLIBS program will act as a model for the industry.

This year has again been a very positive year for sheep research.

The initial bone oil repellent research has been completed. Initial results indicate that bone oil will repel coyotes. Further work is needed to identify alternative delivery methods. Bone oil will provide an additional tool that producers can use to deter coyotes in the future.

Weight adjustments have been developed and implemented for realtime ultrasound loin muscle and fat depth measurements. Producers can now compare animals within a group that are the same breed when selecting for carcass traits like improved muscling and reduced fat.
Research into use of MGA has been established for natural and AI breeding programs. There is a huge uptake by the industry of this technology. It is necessary to objectively measure and design appropriate programs for use in sheep.

There have been steady improvements in the results from in vitro embryo production. This work is now to the stage of offering some service to OLIBS purebred producers and replicators to bring in problem ewes to U of G for slaughter ovary recoveries to produce OLIBS offspring through oocyte recovery and IVF. After the final mechanics are worked out the technology can be offered to a wider group of producers. Another recent research success has been to recover oocytes from 8 week old lambs on-farm, return the oocytes to Guelph lab, and successfully produce embryos the next day. This is an important demonstration of on-farm capability for the system.

COMMITTEE ACTIVITIES

The committee met once on June 1, 1999 at the Ontario Ministry of Agriculture, Food and Rural Affairs office in Orangeville. Overall, attendance was excellent. However, the member representing the Canadian Sheep Federation could not be present for the third year in a row, and the wool processor was not able to be present.. This inhibited discussion of certain areas.

STATE OF THE ONTARIO SHEEP INDUSTRY

Statistics Canada reports a continuing increase in sheep and lamb numbers as of July 1, 1999. The estimated total Canadian inventory of sheep and lambs at July 1, 1999 was 885.4 thousand head, up 6.7 percent from July 1, 1998's estimate of 829.8 thousand head. Canada's flock now stands at 449 thousand breeding ewes, 23.2 thousand breeding rams, 107 thousand replacement lambs and 306.2 thousand market lambs. Ontario and Quebec showed the greatest increases in their breeding flocks, from 1998 (13.8 and 13 thousand head respectively). All other provinces, with the exception of Alberta, showed increases in breeding ewe numbers ranging from 3.4 percent for British Columbia, to 8.7 percent for Manitoba.
(source: www.statcan.ca).

Table 1. Ewe and Lamb Numbers

Ontario Sheep & Lamb Inventory (OMAFRA) ('000 Head)						
	Jan 1st		Jul 1st		% of 98	
Animal Class	1998	1999	1998	1999	Jan 1st	Jul 1st
Rams, 1 Year +	6.8	6.7	7.0	7.5	? 98.5	? 107.1
Ewes	122.0	126.0	124.0	133.8	? ? ? ? ? ?	? 107.9
Lambs, replacement	22.0	21.0	28.0	32.0	? 95.5	? 114.3
Lambs, market	19.5	25.0	73.0	82.0	? ? ? ? ? ?	? 112.3
Total	170.3	178.7	232.0	255.3	? ? ? ? ? ?	? 110.0

Weight adjustments have been developed and implemented for realtime ultrasound loin muscle and fat depth measurements. Producers can now compare animals within a group that are the same breed when selecting for carcass traits like improved muscling and reduced fat.
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Lambs, market	19.5	25.0	73.0	82.0	? ? ? ? ? ?	? 112.3
Total	170.3	178.7	232.0	255.3	? ? ? ? ? ?	? 110.0

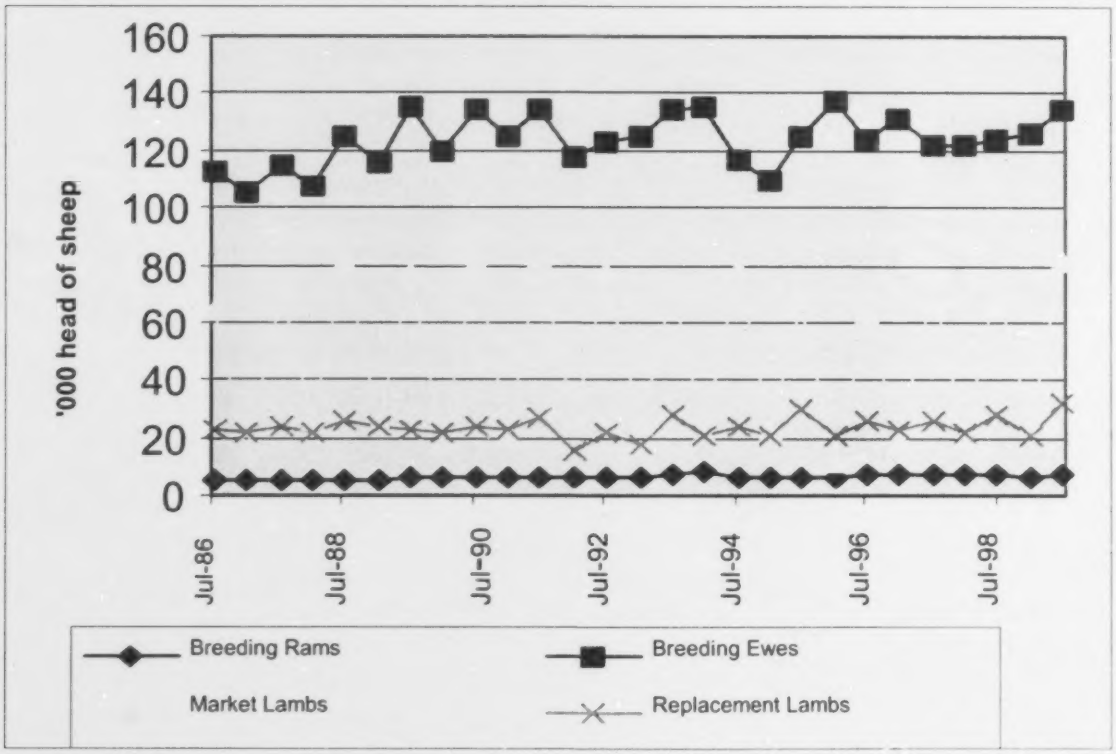
Total sheep numbers appear to have increased in January of 1999 and are up again in July over 1998 here in Ontario. The trend in sheep population over the past thirteen years in Ontario is shown in figure 1 on the next page. The general trend over the past thirteen years has been an increase in sheep population in the province.

1998 numbers are up over 1997 in all areas of the province, particularly in the central region. The western region still dominates in terms of overall population with the counties of Bruce, Dufferin, Grey, Huron, Perth, Simcoe & Wellington contributing the most numbers. These numbers by county are derived from a probability survey conducted by Agriculture Canada.

Table 2. July 1st 1998 Data for Ontario by region

1998	Rams> 1 year	Sheep > 1 year	Lambs<1 year	Total sheep & lambs
Ontario	7,000	131,000	101,000	232,000
Southern Region -	1,410	24,560	16,400	40,960
Western Region	2,880	58,280	41,400	99,680
Central Region -	1,160	20,650	16,800	37,450
Eastern Region -	1,370	21,670	22,400	44,070
Northern Region -	180	5,840	4,000	9,840

Figure 1. Number of Sheep and Lambs in Ontario '86-'99



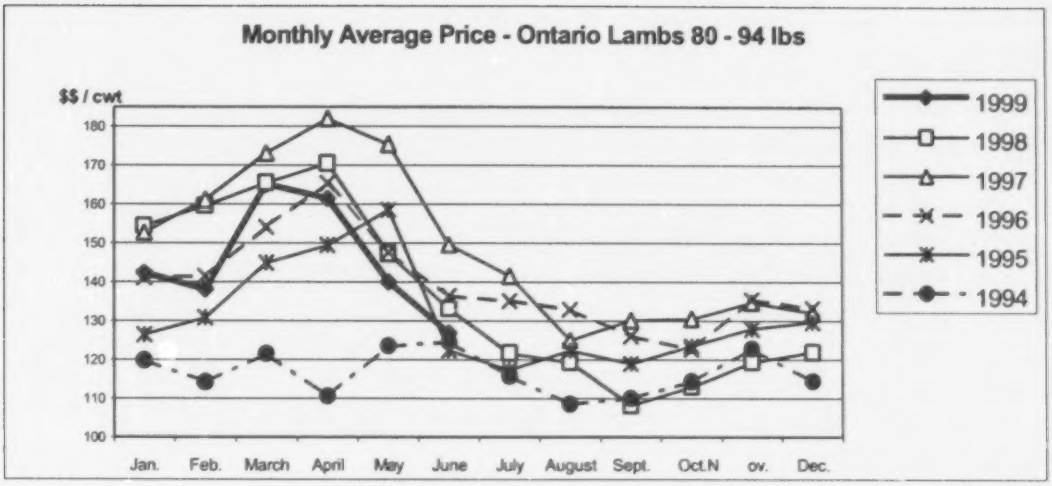
Ontario's flock has shown steady increases in the past 4 years with 1999's breeding numbers increasing by 10.7 percent compared to 1996, and the number of market lambs increasing by an astounding 29.5 percent to 82 thousand head, during the same period. Ontario accounts for 29.9 percent of the national breeding flock, with Alberta following with 23.5 percent, and Quebec rapidly narrowing the gap with 20.8 percent of the national flock.

Table 3. 1998 Lamb Slaughter Numbers and Market Prices:

Type of Animal	Ontario			Quebec		
	# Sold	Avg $/cwt	Range#	Sold	Avg $/cwt	Range
Lamb A&B - 79 lbs	61,028	165.22	95.44-297.68	9,339	137.94	88.00-228.00
Lamb A&B - 80-94 lbs	23,932	132.10	93.68-220.52	5,561	129.49	80.00-220.00
New Crop Lambs	3,712	172.55	79.80-290.02	17,869	191.21	117.00-322.00
Sheep	25,515	66.59	40.84-107.18	7,631	59.92	27.00-94.00

Volumes of lambs to slaughter in Ontario have continued to increase with an increase in volume of lambs sold of 10% over 1997. Average prices received for 80 to 94 pound lambs in 1998 were 5.7 percent lower than those received in 1997 for producers in Ontario. This trend has continued during the first six months of 1999, with prices for 80 to 94 pound lambs averaging about 5 percent below the first half of 1998. However, Ontario markets continue to remain relatively strong compared to other regions of Canada, the United States, and International markets. Comparing prices received for 80 to 94 pound lambs over the past five years, Ontario producers continue to get higher returns than counterparts in other major lamb producing provinces, Quebec, Alberta; and the U.S.

Figure 2 shows the trend of lamb prices by month over the past 5 years. 1995 was the start of an upward trend in prices that continued until 1997. 1998 shows a decrease in prices compared to 1997 in all months. In the first half of 1999, there is again a decrease in price but overall the prices are still good compared to the low prices experienced in 1994.



Imports & Exports

Imports - Dressed Meats

Australia remains as our major supplier of mutton. During 1998, Canada imported 1,218 metric tonnes of mutton from Australia out of total mutton imports of 1,804 metric tonnes. Mutton cuts, bone-in, continues to account for most of the mutton imports at 1,170 metric tonnes, virtually unchanged from 1997. Imports of mutton carcasses showed a 23 percent decline at 365 metric tonnes, while boneless mutton showed a 63 percent increase at 269 metric tonnes when compared to 1997 figures. In the first six months of 1999, 1,130 metric tonnes of mutton were imported into Canada, a 25.6 percent increase over the same period last year.

Dressed lamb imports were 8.6 percent higher (9,610 metric tonnes) in 1998, compared to 1997 (8850 metric tonnes). New Zealand continues to supply the majority of lamb that Canada imports, accounting for 74.7 percent (7174 metric tonnes) of dressed lamb imports in 1998. Lamb cuts with bone-in accounts for the largest portion of dressed lamb imports and saw a 17 percent increase (7549 metric tonnes) compared to 1997 figures. During the first six months of 1999, 5,044 metric tonnes of dressed lamb was imported, a 7.8 percent increase over the same period last year. True to form, New Zealand continues to account for most dressed lamb imports (77.1 percent) in 1999.

Exports - Dressed Meats

Canada exports very little dressed lamb and mutton, compared to the amounts we import. However, exports in 1998, continued their upward trend after recovering from 1996's low. In 1998, all exports were of dressed lamb(427 metric tonnes), with no mutton exports. This represents

a 52 percent increase over 1997 figures. Exports to the United States accounts for 69.6 percent of all exported dressed lamb with 19.9 percent (85 metric tonnes) going to Mexico. Mexico became a new export market for Canadian lamb in 1997, accounting for 70 of the 281 metric tonnes of dressed lamb exported in 1997. Most Canadian dressed lamb is exported as cuts with bone-in, representing 77.5 percent of 1998's export volume.

Live Imports from United States

Imports of all sheep and lambs from United States totalled 14,373 head for 1998, an increase of 40.8 percent over 1997.

Import of slaughter sheep and lambs for 1998 from United States totaled 7386 head, down 8.3 percent compared to 1997. The majority of these came to plants in Ontario (6,775 head) with the rest going to plants in Quebec. To June 30th, 1999, 2193 head of slaughter lambs have been imported, less than half the numbers imported during the same period in 1998 (5,615).
No feeder sheep and lambs were imported during 1998, or during the first six months of 1999.

SHEEP & LAMBS IMPORTED FROM THE UNITED STATES - 1998

BORDER CROSSING	B.C.	ALB.	SASK.	MAN.	ONT.	QUE.	ATL. PROV.	CANADA 1998	1997	1996	1995	1994
SHEEP and LAMBS												
SLAUGHTER	0	0	0	0	6775	611	0	7386	8058	21693	18046	13883
FEEDER	0	0	0	0	0	0	0	0	0	212	531	308

Source: Red Meat Division, Agriculture & Agri-Food Canada

Live Exports to United States

Exports of all sheep and lambs to the United States totaled 46,061 head for 1998, an increase of 14.6 percent over 1997. Feeder lambs account for the majority of these, with 30,405 head (10.6 percent more than in 1997) going to feedlots south of the border. All of these lambs originated in Alberta, Saskatchewan and Manitoba. This represents a considerable increase when compared to 1996, which saw no activity in export of feeder sheep or lambs.

Slaughter lamb exports to the United States continued the downward slide started in 1996. In 1998, Canada exported 33.4 percent fewer slaughter lambs (11,996 head), compared to 18,006 head during 1997, and 43,317 in 1996. The majority of 1998's lambs were from Manitoba (7,517), Saskatchewan (835), and Alberta (3,493). The slaughter lambs exported from Ontario in 1998 (129 head) went to plants in Michigan and New York.

SHEEP & LAMBS EXPORTED TO THE UNITED STATES - 1998

ORIGIN	ALBERTA			SASK 10%	MAN. 90%	TOTAL	ONTARIO			QUEBEC	CANADA		
BORDER CROSSING	Idaho	Montana	TOTAL	North Dakota			Michigan	New York	TOTAL	Vermont	1998	1997	1996
SHEEP & LAMBS													
SLAUGHTER LAMBS	20	3473	3493	835	7517	8352	96	33	129	22	11996	18006	43317
SLAUGHTER EWES	0	0	0	0	0	0	0	0	0	0	0	0	0
FEEDER	0	1130	1130	2928	26347	29275	0	0	0	0	30405	27488	0
TOTAL	20	4603	4623	3763	33864	37627	96	33	129	22	42401	45494	43317

Source: Red Meat Division, Agriculture & Agri-Food Canada

Animal Surveillance

In 1997, 189,587 sheep and goats were inspected at abattoirs (not divided statistically) and 148,615 sheep and goats were inspected at the sales yard. 10,578 specimens were submitted to the Animal Health Laboratory with 591 submissions and 293 necropsy cases.

US Sheep & Lamb Inventory

1999 numbers show a continuing trend of decreasing sheep numbers nationally. According to the July 1, 1999 sheep inventory estimate report, there were 9.0 million head of sheep in the United States on July 1st, 4.3 percent fewer than one year ago. The breeding sheep inventory declined to 5.35 million head, 4.0 percent smaller than 1998's but slightly larger than January's count. There were 4.38 million head of ewes one-year and older, 215,000 head of rams one year old and older, and 755, 000 head of replacement lambs (including newborn lambs). As of July 1st, 1999, there was also 3.575 million head of market lambs available in the U.S. which is 4.4 percent fewer than one year ago.

The 1999 U.S. lamb crop is estimated at 4.75 million head, down 5 percent from the 1998 lamb crop of 5.01 million head. Lambs born during January through June, 1999 totaled 4.21 million head, or 89 percent of the yearly total. An additional 540,000 head are expected to be born during the period July through December 1999.

United States slaughter estimates for the first half of 1999 continue the downward spiral that has been occurring for the past five years. Slaughter to July 1st was 2.1 million head, down 6 percent from a year ago. Although the August lamb prices have recovered somewhat from the low of $70.5 US per hundered weight in July 1999, they are still 2.4 percent lower than a year ago. San Angelo, Texas prices were $80.5 US per hundered weight for choice slaughter lambs during August 1999. Feeder lambs are trading about 4.5 percent lower than a year ago.

The United States government introduced higher duties for the next three years on all imported lamb. Imports up to quota levels set at 1998 import levels will be subject to a 9 % duty, while

imports above the quota will face sharply higher tariffs, starting at 40 % in the first year, and then declining. Lamb meat from Canada and Mexico are excluded from the import restrictions.
As part of the assistance package, the American sheep industry is to receive $100 million over the next three years as funding for productivity improvements, market promotion, animal health and domestic purchases.

Purebred Registrations

Total sheep registrations for 1998 are 13,820. This number is down slightly from last year. Quebec registered the largest number of sheep (5,368) followed by Ontario (4,225) and Alberta (1,677).

CANADIAN PUREBRED SHEEP REGISTRATIONS
(BREEDS REGISTERING MORE THAN 50 ANIMALS IN 1998)

BREED	1993	1994	1995	1996	1997	1998	BREED	1993	1994	1995	1996	1997	1998
KATAHDIN	0	0	0	577	**3106**	n/a	HAMPSHIRE	749	718	710	624	515	666
ARCOTT(CAN)	169	401	113	187	270	277	ICELANDIC	0	0	59	220	255	336
ARCOTT(OUT)	43	154	185	100	200	281	LINCOLN	173	130	190	129	125	105
ARCOTT(RID)	290	880	609	1,038	**895**	**1274**	N.C.CHEVIOT	458	537	504	465	498	566
B. LEICESTER	429	344	302	288	284	245	OXFORD DOWN	324	293	249	264	237	229
CHAROLLAIS	0	0	0	122	91	107	POLYPAY	849	49	711	757	393	917
CHEVIOT	115	100	85	73	80	68	RAMBOUILLET	236	301	355	172	132	157
CLUN FOREST	75	106	118	172	141	150	ROMANOV	899	1,014	1,267	717	**839**	**1177**
COLUMBIA	117	162	170	122	121	102	ROMNEY	204	288	116	138	161	142
DORSET	2,319	3,126	3,444	2,657	**2,304**	**3058**	SHROPSHIRE	106	100	68	96	81	62
EAST FRIESAN	0	0	0	45	56	174	SOUTHDOWN	363	393	342	298	318	316
FINNSHEEP	0	98	146	0	196	n/a	SUFFOLK	2,946	2,848	2,712	2,638	**2,556**	**2932**
							TEXEL	44	711	153	106	161	165

Dairy

The dairy sheep industry is one of the newest and fastest growing agricultural industries in Ontario.

Currently there are 25 producers in Ontario actively shipping milk to at least 4 dairies. The flock size ranges from 3 to 100 milking ewes, with some farms expanding to milk up to 500 ewes.

The dairies produce 5 different kinds of sheep cheeses. The dairies report that the demand for Ontario made sheep cheeses is good and that they are currently testing the market. Milk prices in Ontario range from $1.20 to $1.75 per kg. Compared with the rest of Canada, where prices range from $1.65 to $2.20, Ontario has the lowest milk prices.

The demand for sheep milk is year round but production tends to be seasonal. This is common in most of the sheep milk producing countries around the world. The year-round supply of milk is derived by freezing surplus milk in the summer and delivering it in the winter months. Sheep milk does not change its quality with freezing, which is a big advantage for smaller producers.

Currently, most of the milk is frozen right after milking and delivered to the dairies on arranged schedules or when a certain quantity is reached.

Wool

Wool markets continue the decline experienced in the past several years. This is being blamed on the collapse of the Asian economy, subdued Chinese markets, and a flood of cheap imports of woolen goods onto the North American market. The Australian government has frozen sales of wool from their stockpile for the remainder of the 1999 season.

Canadian producers are receiving about 50 percent less for their wool compared to a year ago, as are producers in the United Kingdom. Alternative marketing avenues, including further processing, can be viable options for the producer with strong marketing skills and close proximity to large numbers of "wool buying" customers. Regardless of method of sale, proper handling and skirting of the raw wool will ensure Canadian wool maintains its quality status with buyers

Ontario Sheep Flock Improvement Program

Enrolment is basically the same as last year with 130 producers entering 11,961 lambs in 1998. This represents 6,061 ewes, and 6,376 lambings and 24 breeds (including cross-breds). Average # born per lambing was increased to 1.9 and average # weaned per lambing was 1.6. There was an increase in the numbers of ewes and lambs in the system from the same number of producers enrolled again showing the trend toward larger average flock size in the industry.

Estimated progeny differences (EPD's) are being used by 60 –70% of producers enroled Values are being produced for: birth weight direct, birth weight maternal, 50 day gain direct, 50 day gain maternal, 100 day gain, number born per lambing and number weaned per lambing. The program allows for electronic transfer of data from EweByte to SFIP and back.

The real time ultrasound project which provides technology for estimating back fat and loin eye is being offered to SFIP producers at $75 per visit until March 31, 2000. Data was collected on 993 animals on 13 different farms in 1998. Adjustment factors for the realtime data was developed and distributed to the participating producers. In fall of 1999, genetic evaluations will be available for these traits from the university of Guelph research program and will be implemented upon receipt.

SFIP is pursuing the genetic evaluation of out of season breeding, lambing interval and other maternal traits in conjunction with a project at the University of Guelph.

Extension Support

Extensive work was done to try and re-instate snaring regulations for use in predator control. This was not successful to date and there are very few aids to control problem predators.

Lead positions for nutrition and milk quality have been active in the sheep industry. Work is underway to collect data from dairy ewes that can be used in the nutrition modelling project. The

milk quality lead has also been involved in preliminary work needed to start the development of safety and quality standards for sheep milk.

Work has been done to start updating the sheep factsheets. Many factsheets have gone out of print and more are needed to provide some basic information to beginning producers.

There has also been an emphasis on collecting sheep economic data through the OFMAP process from larger commercially orientated flocks. This information is needed to provide the basic economics for potential producers to assess the viability of entering the sheep industry.

There has been an increase in extension information and support requested by veterinarians this year with 60 calls from Jan 1/99 – June 1/99. This is another indication that there are more commercially sized operations.

V. EMERGING NEEDS / ISSUES

- The creation of quality assurance and national identification programs has become important to ensure market access in the future. The industry must make sure that these things are in place so that opportunities can be recognized and utilized in the future. There will be many issues as a result of this process since it is a small industry where there are few drugs labelled for sheep use and many small producers entering and leaving the industry.

- The industry has increased in size and there are more large commercially orientated producers than in the past. Technology transfer and communications must be a priority to meet the needs of the leading edge producers and ensure that research information resulting from this program is transferred to those producers as soon as possible. This is difficult in an industry that doesn't attract many private consultants where there are many small producers entering the industry on a regular basis that need basic information and technology.

RESPONSE TO 1998 RECOMMENDATIONS

RECOMMENDATION #1 **PRIORITY 1C**
TO ARIO

REPRODUCTION

OBJECTIVES

1. Develop and evaluate improvements in the practicality of embryo transfer technologies, particularly in super-ovulation, embryo freezing, transfer, sexing, twinning, cloning in juvenile and mature ewes. This also includes evaluating methods for relaxing the cervix to improve success of artificial insemination and embryo transfer.
2. Develop a practical technique to recover unfertilized eggs (oocytes) from ovaries of immature lambs for in vitro fertilization.
3. Develop and evaluate a technique for in vitro gamete fertilization and transfer (in contrast to embryo transfer).

4.D evelop techniques to improve the survival of frozen ram semen and extend the survival of fresh ram semen.

Response
ARIO
Research Priority Areas (as directed to ARIO):
1) Reproduction; 2) Health; 3) Nutrition; 4) Management & Economics; 5) Genetic Improvement; 6) Meat Production & Evaluation

The ARIO accepts the above priorities as the 1998 research priorities of the dairy subcommittee. It is acknowledged that these priorities remain the same as in 1997.

The current sheep research program at the University of Guelph supports the above priorities through the Ontario Lamb Improvement Breeding Strategies (OLIBS) program. This program was designed to develop an infrastructure for the production of consistently high quality lambs throughout the year. This is to be accomplished through research and service programs in genetics, health, reproduction, economics and product evaluation.

***UNIVERSITY OF GUELPH**: These details are being addressed in the following projects:*

Project No.	***Project Leader***	***Project Title***
23160	***Buckrell, B.***	*Improvements in embryo and semen technologies to increase the productivity of sheep production*
18640	***Walton, J.***	*Identification of Sheep with Extended Breeding Seasons*

RECOMMENDATION #2 **PRIORITY 1C**
TO ARIO, AAFC

HEALTH

OBJECTIVES

1. Develop an Ontario Sheep Flock Health Improvement Program that will encourage proper flock health management and drug use and will allow for accreditation of disease status of sheep flocks.
2. Use data collected from on-farm management programs to evaluate health and productivity and impact of disease and its eradication on selected farms.
3. Efficacy of treatment modalities in curing copper exposed sheep needs to be evaluated as well as addressing the risk of various feeds and feed preparation techniques.
4. Develop and / or assess diagnostic tests for detection of scrapie either in postmortem or live animals. Using established surveillance techniques, monitor the prevalence of scrapie in Canadian sheep.

Response
ARIO: *See response to #1.*

UNIVERSITY OF GUELPH: These details are being addressed in the following projects:

Project No.	*Project Leader*	*Project Title*
22710	***Prescott, J.***	*Gamma-interferon assay for diagnosis of caseous lymphadentis in sheep*
22930	***Menzies, P.***	*Maedi-Visna Flock Certification Program Based on a Recombinant ELISA: Economic Analysis of Costs and Returns*

AAFC: *The Animal Disease and Research Institute of the CFIA should be pressured into doing work on scrapie. Other health issues are not considered the responsibility of the AAFC. The non-research issue of scrapie surveillance is an excellent idea if one is to better understand the prevalence of this disease.*

AAFC does not have an official research program on sheep production but it is able to respond to some of the requests made by the industry through research endeavours that are done on the ruminant (chair note - sheep as a ruminant model)

RECOMMENDATION #3 **PRIORITY 1B**
TO ARIO, U OF G

NUTRITION

OBJECTIVES

1. Develop a computer model for the nutritional requirements of prolific heavy milking ewes. Study the nutritional requirements of the prolific maternal lines produced under different management systems such as annual and accelerated.
2. Compare various pasture and forage management techniques for reducing the cost of feeding sheep.
3. Develop an accurate mechanistic computer model for fast growing lambs sired by terminal sire breeds. Compare various feed production systems for feedlot lambs of terminal sires.
4. Assess the utility of such factors as rumen degradable protein and carbohydrates at maximizing rumen fermentative capacity.

Response
ARIO: *See response to recommendation #1.*

UNIVERSITY OF GUELPH: *These details are being addressed in the following project:*

Project No.	*Project Leader*	*Project Title*
23030	***Cant, J.***	*Developing a computer model of nutrient utilization in prolific, heavy-milking ewes*

RECOMMENDATION #4 **PRIORITY 1B**
TO ARIO, U OF G

MANAGEMENT & ECONOMICS -

OBJECTIVES

1. Evaluate the economics of applying embryo tranfer technologies for genetic improvement in sheep production as measured within the OLIBS study.
2. Compare the economic performance of selected maternal lines with traditional breeds under different management systems such as annual lambing and accelerated lambing.
3. Evaluate and improve the existing OMAFRA-supported computer program (EweByte) for the evaluation of health, productivity and genetic record keeping, particularly within the OLIBS study.
4. Identify potential microbial, mechanical and chemical hazards which relate to lamb and sheep meat products and identify potential control points and risk factors during production, transportation and slaughter process .
5. Develop an economical, effective permanent animal identification system.

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Response
ARIO *- See response to recommendation #1*

UNIVERSITY OF GUELPH*: These details are being addressed in the following projects:*

Project No.	***Project Leader***	***Project Title***
22970	***Fisher, J.***	*Optimization of production/marketing cycles for sheep*
18630	***Fisher, J.***	*An Analysis of Costs and Returns of Managing Sheep Flock Health*

RECOMMENDATION #5 **PRIORITY 2C**
TO: ARIO, U OF G, CARC

GENETIC IMPROVEMENT -

OBJECTIVES

1. Develop an overall breeding strategy for the development of maternal trait sheep and evaluate available systems to compare these maternal trait sheep within and across flocks. Incorporate new maternal trait EPD's of the SFIP as well as the maternal trait indexes developed at the University of Guelph, and evaluate and integrate the information through an on-farm data collection and analysis program - EweByte.
2. Develop adjustment factors for use in across flock Sire Referencing Schemes.

Response
ARIO: *See response to recommendation #1.*

UNIVERSITY OF GUELPH*: These details are being addressed in the following projects:*

Project No.	*Project Leader*	*Project Title*
16180	***Wilton, J.***	*Breeding strategies and genetic evaluations for carcass merit for progeny of OLIBS ewes.*

RECOMMENDATION #6 **PRIORITY 2B**
TO ARIO, U OF G, CARC

MEAT PRODUCTION & EVALUATION -

OBJECTIVES

1. Evaluate the carcass characteristics of the maternal lines produced under OLIBS.
2. Evaluate changes in carcass composition of lambs produced by terminal sire crosses of maternal trait dams and of lambs produced from sire referencing schemes.
3. Determine the appropriate fat cover for shelf life, palatability and consumer acceptance.

Response:
ARIO*: See response to recommendation #1.*

UNIVERSITY OF GUELPH*: These details are being addressed in the following projects:*

Project No.	*Project Leader*	*Project Title*
16180	***Wilton, J.***	*Breeding strategies and genetic evaluations for carcass merit for progeny of OLIBS ewes.*
16190	***Johnston, J.***	*Forage-based sheep production and management systems.*
16200	***Johnston, J.***	*Applied aspects of sheep production and marketing.*

1998-1999 Registered Projects for the University of Guelph - OMAFRA Sheep Program

OASIS #	RESEARCHER	TITLE
OMAFRA Sheep Research Program - additional funding agencies in brackets		
23160	B.Buckrell/Pollard	Improvements in the application of embryo and semen technologies to improve sheep production (CanAdapt)
23030	J. Cant	Developing a computer model of nutrient utilization in prolific, heavy milking ewes
13350	P. Menzies	Development and implementation of a system for monitoring and evaluating health, performance and productivity in Ontario sheep (IRAP)
22710	J.F. Prescott	Gamma-interferon assay for diagnosis of caseous lymphadentis in sheep.
22930	P. Menzies	Maedi-visna flock certification program based on a recombinant ELISA: Economic analysis of costs and returns
16180	J. Wilton	Breeding Strategies and genetic evaluations for carcass merit for progeny of OLIBS ewes
16190	J. Johnston	Forage-based sheep production and management systems
16200	J. Johnston	Applied aspects of sheep production and marketing
18640	J. Walton	Identification of sheep with extended breeding seasons.(Gartshore)
18630	J. Fisher	An analysis of costs and returns of managing sheep flock health (OSMA & Gartshore)
22970	J. Fisher	Optimization of production/marketing cycles for sheep
NON OMAFRA FUNDED PROJECTS (FUNDING AGENCIES IN BRACKETS)		
	P. Menzies	Survey of selenium and vitamin E levels in sheep livers in Ontario abattoirs (Gartshore)
	P. Menzies	A survey of copper levels in sheep livers in Ontario abattoirs. (OSMA)
	B. Buckrell	Development of an on-farm program using fresh chilled ovine semen (CSBA, OSMA, SR Genetics and CanAdapt)
	T. Duffield	An evaluation of the effect of tilmicosin in ewes prior to lambing on incidence of clinical mastitis and subsequent lamb performance. (Elanco/Provel)
	T. Fernandez	Development of a real time ultrasound, live carcass evaluation data collection system for sheep. (Rural Job Strategy, OSMA and the Ontario Suffolk Sire Reference Scheme)
	A Meister	Development of a computerized sheep milk recording system. (OSMA and the Ontario Dairy Sheep Association)
	D Westaway	The sheep dopple gene: encoding a novel prion-like protein - isolation and characterization (U of Toronto and OSMA)
	J. Johnston	Cost and returns of irrigating sheep pasture (OSMA)

NON RESEARCH RECOMMENDATIONS

RECOMMENDATION #1
TO OMAFRA & CFIA - ANIMAL AND PLANT HEALTH – AAFC
MAEDI VISNA CERTIFICATION PROGRAM

As part of the OLIBS project, a provincial flock health program will be made available to Ontario sheep producers. Level 1 which involves no disease testing, will be administered by the Ontario Sheep Marketing Agency. However, the industry is very anxious to have specific disease accreditation programs for diseases such as Maedi Visna. The intent is to have a cost recovery provincial program, administered by both OMAFRA and OSMA. OMAFRA would take on the fee for service role of assuring the correct paperwork were submitted by the veterinarians doing the flock testing, receiving the results of the test and issuing certificates of status. OSMA would coordinate with OMAFRA on providing a list of those producers enrolled in the Level 1 program (a pre-requisite for any Level 2 program)

Response
OMAFRA – Agriculture & Rural Division

The Level 1 component of the Ontario Sheep Flock Health Program is currently at the pilot project testing phase. Maedi Visna testing is a component of phase 2. A laboratory located at the Centre for Animal and Plant Health in Prince Edward Island will be performing the tests on samples submitted for analysis. These tests are expected to be available in the fall of 1999.

RECOMMENDATION #2
TO OMAFRA

EXTENSION SUPPORT

- To increase the level of **sheep specialist** support by 1.0 FTE to service those producers increasing their flock size and / or moving to more intensive forms of flock management and locate this person at the Fergus office (Wellington Place).
- To increase the level of extension support for **health management consultant** to 0.25 for sheep and 0.25 for goats.
- To increase the level of extension support for **nutritional consulting** by 0.1 FTE since this area is not well served by private consultants.
- To move the **dairy sheep** extension effort to the dairy cow specialists.
- To support the administration, along with the Ontario Sheep Marketing Agency, of the **Ontario Sheep Flock Health Program**, due to be released within the year.
- To develop a **Sheep Livestock Medicines course** for use in the provincial quality assurance program.
- To support the updating of the **Ontario Shepherds Manual** with participation from the sheep specialist(s) and health management consultant.
- To support the development of the **On-Farm Quality Assurance** program, currently being developed by OSMA and other provincial and national bodies with participation from the sheep specialist(s) and health management consultant.

- Continue to support the **Predator Information Officer** position. This position should also be responsible for administration of the integrated predator (vertebrate pest) management program.
- To maintain the level of support for OLIBS and non-OLIBS producer and veterinary continuing education.
- To promote and support continued cooperative research-extension efforts with the University of Guelph researchers, with particular reference to the OLIBS project.

Response
***OMAFRA* – Agriculture & Rural Division**

1. *Additional staffing of 1.0 FTE for a sheep specialist is not possible as all salary allocation is required to support existing positions in Livestock Technology. Adjustments through the employment of 3 sheep consultants, dedicating a portion of a Beef and Sheep Nutrition Program Lead's time to sheep and training of Agriculture and Rural Representatives in sheep production and management to respond to producer inquiries has enabled current sheep specialists to dedicate additional time to producers planning flock expansion and/or implementing more intensive management systems.*
2. *The Veterinary Scientist in Health Management is allotting additional time to sheep and goat health management than was previously the case.*
3. *The establishment of a Beef, Sheep and Goat Nutrition Program Lead position with responsibility for sheep nutrition technology transfer will meet the goal of 0.1 FTE.*
4. *A team of ministry staff, including the dairy milk quality program lead, staff in the Dairy Inspection Unit of Food Inspection Branch and a provincial sheep specialist will bring the necessary resources to this subject matter area.*
5. *Staff in the Livestock Technology Unit of the Agriculture and Rural Division will work with the Ontario Sheep Marketing Agency in determining roles and responsibilities for the administration of the Ontario Sheep Flock Health Program.*
6. *The first draft of a Livestock Medicines Course for sheep producers is completed. The Ontario Sheep Marketing Agency has offered assistance in preparing future drafts.*
7. *A Sheep Production Manual has been produced by sheep producer organizations in Alberta and Saskatchewan. The Canadian Sheep Federation has completed negotiations with Alberta / Saskatchewan for the rights to the script and to make the script available to any other province. OMAFRA sheep specialist staff have offered to review the script and recommend changes to make the document relevant to Ontario conditions. The Ontario Sheep Marketing Agency has indicated that they will publish the "Ontario version".*
8. *The Livestock Technology unit supports the development of an On Farm Quality Assurance Program and has offered technical expertise as a member to a national committee responsible for the development of such a program. This offer is based on approved funding and project approval by the Canadian Federation of Agriculture.*
9. *The ministry continues to provide funding for the Predator Information Officer position.*
10. *Continuing education in sheep production disciplines including health is a core business of the Agriculture and Rural Division. The present level of support will be maintained to producers regardless of enrollment status in Ontario Lamb Improvement Breeding Strategy (OLIBS).*

11. *Ministry staff participate with University of Guelph researchers [genetics, nutrition, health, business, environment] in the development and conduct of various research endeavors including OLIBS related research.*

RECOMMENDATION #3
TO AAFC-CANADIAN FOOD INSPECTION AGENCY, OMAFRA & THE ANIMAL HEALTH LABORATORY, LABORATORY SERVICES DIVISION, UNIVERSITY OF GUELPH

SCRAPIE PROGRAM

In the last two years, the number of flocks with diagnosed cases of scrapie has increased dramatically, indicating that the current control program is not sufficient in controlling this disease. We recommend that a ***passive Scrapie surveillance system*** be implemented that will screen adult sheep for Scrapie that are submitted to Ontario Animal Health Laboratories for neurological disease. An ***active surveillance system*** on slaughter house cull sheep should also be considered and implemented as soon as possible. In addition, a ***voluntary scrapie disease status certification program*** should be established for the province and perhaps for the country.

Response
***OMAFRA* – Agriculture & Rural Division**

The Ontario Ministry of Agriculture, Food and Rural Affairs recommend that a passive scrapie surveillance system be implemented that will screen adult sheep for scrapie that are submitted to AHL for neurological disease.

This is in place. The University of Guelph does not have the resources to take the next step of checking the brain of every adult sheep for scrapie.

An active surveillance system on slaughter house cull sheep should also be considered and implemented as soon as possible. In addition, a voluntary scrapie disease status certification program should be established for the province and perhaps for the country. Such programs would require additional funding.

***UNIVERSITY OF GUELPH**: The University of Guelph does not maintain a program to undertake this type of surveillance. The issue will, however, be referred to the Sheep Program through the coordinator.*

RECOMMENDATION #4
TO OMAFRA - FOOD INSPECTION BRANCH AND THE DAIRY FARMERS OF ONTARIO

SHEEP MILK QUALITY CONTROL

It is unclear who is responsible for the administration of the Milk Act with respect to sheep and goats since the transfer of the Raw Milk Quality Program to the Dairy Farmers of Ontario. Both

the dairy sheep and dairy goat industries are growing exponentially. Both have milk quality issues and both need to be strongly regulated and guided to assure a wholesome product is provided to consumers. Clarity regarding the appropriate mechanism of regulation is required.

Response
***OMAFRA* – Food Inspection Branch**

1. GOATS
The administration and enforcement of the Milk Act and Regulation 761, with respect to goat milk quality is a separate program from that which is carried out by Dairy Farmers of Ontario for cow milk and cream producers. OMAFRA remains responsible for the administration and enforcement of safety and quality regulations for goat milk. There has been NO CHANGE is this regard. The fieldstaff (2), provide their expertise, free of charge to the industry, and are both experienced and duly appointed under the Milk Act to carry out their inspections with the same power and authority as past OMAFRA fieldpersons. Priority is given to inspections for new producers and to producers where there is a quality concern or processor complaint. There are on-going concerns about the frequency of laboratory testing of raw goat milk, these are mainly logistical in nature (largely due to once a week pick up of milk at the farm) and the costs associated with improvements in this area are prohibitive.

2. SHEEP
Under the Milk Act (Ontario), Definitions, Section.(1) reads "milk" means milk from cows or goats. Clearly, by definition under the act there is no authority to regulate sheep milk production or processing. The National Dairy Regulations and Code (NDR&C) does however contemplate the application of safety and quality regulations to other species and defines milk to "mean a normal lacteal secretion obtained from the mammary gland of a diary animal". It is OMAFRA's intention to change the current definition of milk to that suggested by the NDR&C. It will be difficult however to apply the regulatory provisions of the NDR&C to the dairy sheep industry in an appropriate and meaningful manner since sheep milk production employs practices that are different from other species. In addition, there is limited information available with respect to appropriate and acceptable safety and quality standards, particularly for application in Ontario and Canada. In order to "strongly regulate" there must first be appropriate science (risk assessment etc.) upon which to base the regulatory requirements. OMAFRA will continue to work closely with the dairy sheep industry to develop and implement the appropriate regulatory framework.

Fortunately most of the current commercial processing of sheep milk takes place in dairy processing plants that already hold a provincial dairy plant licence to process cow or goat milk. Processing plants wishing to begin manufacturing operations to process sheep milk have in most cases, voluntarily agreed to meet current regulatory requirements. With respect to production aspects of the sheep milk industry Ontario Dairy Sheep Association has been working with OMAFRA on issues and concerns related to the implementation of the NDR&C for over a year.

RECOMMENDATION #5
TO OMAFRA - FOOD INSPECTION BRANCH
CONTROL OF UNREGULATED SLAUGHTER

The continued practice of illegal on-farm slaughter of uninspected carcasses which are then sold in stores, appears to be growing and there are insufficient numbers of investigators to control it. Funding of more investigators to control and limit these practices is required to assure only wholesome products are sold to consumers.

In addition, often stores will sell uninspected game at the same time as inspected carcasses, increasing the risk of cross-contamination of important zoonotic diseases such as leptospirosis, tuberculosis or rabies. Enforceable regulations need to be created to prevent this potentially dangerous practice.

Response
***OMAFRA* – Food Inspection Branch**

The ministry is aware that tighter enforcement of standards in licensed abattoirs as a result of food safety concerns and the move to national standards may have some unintended results. Some plants may continue to slaughter without inspection or some individuals may choose to slaughter without applying for a license to conduct slaughter. Tighter economic margins in today's global marketplace may drive people to slaughter livestock without investing in the facilities and equipment required to obtain a license.

There is little evidence to support the view that large amounts of uninspected meat are getting into the commercial foodservice or retail system. In most cases to date, consumers were deliberately seeking out this illegal product at the farm gate – in many cases for cultural traditions - in other cases to obtain a cheaper product. Local health units are mandated by the Ministry of Health to inspect food premises one to three times a year based on risk. Uninspected meat is not permitted to be retailed under the Health Promotion and Protection Act and would be seized and charges laid. There have been only a few cases and mostly in the larger metropolitan areas.

The ministry is utilizing its investigative resources to the fullest to control illegal slaughter at the farm level. Inspection staff and managers at the field level are assisting in an advisory function and dealing with complaints received from industry and consumers. Obvious illegal situations are passed on to the Investigative Unit for enforcement actions.

The ministry is engaged in a major review of the investigation program to determine the resources required to meet regulatory requirements and to focus resources on the highest risk areas.

RECOMMENDATION #6
TO AAFC - CANADIAN FOOD INSPECTION AGENCY
BRUCELLA OVIS CONTROL

No response was received to our previous recommendation. Brucella ovis is an emerging disease in sheep in Canada. Experience in other countries (e.g. USA, New Zealand) tells us that by ignoring this disease, its prevalence and its outcome- infertility will climb rapidly. The disease is relatively rare in Ontario but increasingly common in the western provinces. Recommendation for the cessation of testing of sheep imported to Canada has been very controversial in the sheep industry. Serological testing for other than export, should be readily available to veterinarians that are attempting to identify and control this disease.

Response
AAFC: No response received.

RECOMMENDATION #7
TO OMAFRA - FOOD INSPECTION BRANCH & AFFC - CANADIAN FOOD INSPECTION AGENCY
ABATTOIR CARCASS INSPECTION & DISEASE SURVEILLANCE:

No response was received to our previous recommendation. Inspection and reporting of diseases that have either an economic or public health impact should be strongly supported. Diseases such as Johne's disease, *Brucella ovis* epididymitis and Caseous Lymphadenitis should be reported back to the producer and also as part of a national data base (as with Scrapie). We support the rapid implementation of a national livestock identification program which would allow this.

Inspection and reporting of diseases that have either an economic or public health impact should be strongly supported. Diseases such as Johne's disease, *Brucella ovis* epididymitis and Caseous Lymphadenitis should be reported back to the producer and also as part of a national data base (as with Scrapie).

Response
***OMAFRA* – Food Inspection Branch**

The ministry recognizes that information gathering and data analysis capacity has traditionally been quite weak. As part of Year 2K preparedness, the Food Inspection Branch is upgrading its computers and software to better serve the needs of all stakeholders and enable better risk management in respect to program delivery. Completion of this Food Safety Decision Support System (FSDSS) will allow carcass disposition data to be made available in a more timely and useable manner to the industry. Any public health or regulatory agency will have access through the Internet to this information.

In addition attempts are being made to strengthen the veterinary inspection support at all provincially inspected abattoirs. Mechanisms include piloting the use of digital imagery in the abattoir setting and increased staff training. The ministry maintains a Veterinary Help desk to

give phone support to all inspectors on abnormal animals and livestock. Local appointed veterinary inspectors are called in as required.

The federal meat inspection program delivered by the Canadian Food Inspection Agency (CFIA) also collects carcass disposition data and makes this available through the Internet to the industry on an aggregate level.

The mandatory livestock identification system being promoted by the Canadian Cattlemen's Association and others will create the potential for actual producer feedback on conditions detected at slaughter. In addition there will be the ability to trace back animals found to be infected with serious diseases or contaminated with drug residues. Dec. 31, 2000 is the targeted date for the national livestock identification program (cattle) to commence.

The APHIN initiative of Canadian Pork is an example of a producer group initiative to utilize this data. Mandatory ID will provide for the expansion of this.

The Ontario Animal Health Surveillance Network (OAHSN) coordinated by the ministry in conjunction with the Animal Health Lab and the CFIA also utilizes carcass disposition data as part of its monitoring of disease trends in Ontario livestock. OAHSN works closely with the national animal surveillance efforts of the CFIA to ensure that non reportable but economically important animal disease trends are closely monitored.

VII. SUMMARY OF DISTRIBUTION OF RECOMMENDATIONS

Recommendation	ARIO	*AAFC & CFIA*	*CARC*	*U of Guelph*	*OMAFRA*
RESEARCH					
Reproduction	X			X	
Health	X	X		X	
Nutrition	X			X	
Management & Economics	X			X	
Genetic Improvement	X		X	X	
Meat Production & Evaluation	X		X	X	
SERVICES					
Maedi-Visna program		X			X
Technology Transfer					X
Scrapie Surveillance		X		X	X
Brucella ovis control		X			

1999 RESEARCH & SERVICES RECOMMENDATIONS

RECOMMENDATION #1 **PRIORITY 1C**
TO ARIO, UNIVERSITY OF GUELPH
REPRODUCTION

OBJECTIVES

1. Develop and evaluate improvements in the practicality of embryo transfer technologies, particularly in superovulation, embryo freezing, tranfer, sexing, twinning, cloning in juvenile and mature ewes. This also includes evaluating methods for relaxing the cervix to improve success of artificial insemination and embryo transfer.
2. Develop a practical technique to recover unfertilized eggs (oocytes) from the ovaries of immature lambs for in vitro fertilization.
3. Develop and evaluate a technique for in vitro gamete fertilization and transfer (in contrast to embryo transfer)
4. Develop techniques to improve the survival of frozen ram semen and extend the survival of fresh ram semen.
5. Evaluation of the use of MGA for synchronization with a fresh or frozen AI program. Determination of withdrawl times for milk after synchronizing with MGA.

BACKGROUND

For the goal of the OLIBS study to be realized, the efficient production of embryos, suitable for transfer must be accomplished. Streamlining of techniques and improving success rates are necessary to reduce the cost per lamb born. This is important in the short term, in order to speed up the reproductive rate of genetic progress for on-farm evaluation of the OLIBS maternal trait sheep, but also in the long term for the sheep industry to allow efficient movement of genetics from flock to flock without compromising the health status of the flock. The success of gamete transfer and in vitro fertilization as well as improved artificial insemination success is an integral part of the process and its eventual commercial success.

RECOMMENDATION #2 **PRIORITY 1C**
TO ARIO, U OF G, AGRICULTURE AND AGRI-FOOD CANADA, CANADIAN FOOD INSPECTION AGENCY
HEALTH

OBJECTIVES

1. Develop an Ontario Sheep Flock Health Improvement Program that will encourage proper flock health management and drug use and will allow for accreditation of disease status of sheep flocks.
2. Use data collected from on-farm management programs to evaluate health and productivity and impact of disease and its eradication on selected farms.

3. Efficacy of treatment modalities in curing copper exposed sheep needs to be evaluated as well as assessing the prevalence of the disease and the risk factors of various forages, prepared feeds and feed preparation techniques.
3. Develop and/or assess diagnostic tests for detection of Scrapie either in postmortem tissues or the live animal. Using established surveillance techniques, monitor the prevalence of scrapie in Cdn sheep.
4. Development and evaluation of diagnostic tests for specific production limiting diseases of sheep.

BACKGROUND

Considerable information on the health status of Ontario sheep has been gathered in recent years. Several diseases have been identified that have an economic impact on the health of the Ontario sheep flock. For producers to make significant advances in productivity, these diseases need to be controlled or eradicated. Some require only an improvement in standard health management practises such as vaccination and parasite control. Others require an infrastructure to assure eradication, e.g. maedi-visna infection, caseous lymphadenitis, and others. This infrastructure would involve standardized testing and regulations with the result being a flock accreditation program that would allow other producers purchasing breeding stock, to assume a flock carries a low risk of disease. In addition, it is important to educate producers and veterinarians with respect to quality assurance issues, such as extra-label use of drugs and residue avoidance.

Treatment and prevention of copper toxicity in sheep is an increasingly important issue due to more concentrate feeding of sheep and more risk of feed mill contamination or mix-ups with cattle and swine feeds. Other risk factors include forages and pastures that have been contaminated with copper containing manure. Many of the treatment modalities have not been assessed with respect to short term and long term efficacy, nor their risk to public health. Many times it is difficult to trace back the source of the exposure.
The prevalence of Scrapie is not known in Canada. Recent outbreaks of clinical Scrapie underline the fact that this disease is still an important issue in Canada both in terms of the health of the national flock and for exportation of live animals and sheep products.

RECOMMENDATION # 3 **PRIORITY 1B**
TO ARIO, U OF G

NUTRITION

OBJECTIVES

1. Develop a computer model for the nutritional requirements of prolific heavy milking ewes. Study the nutritional requirements of the prolific maternal lines produced under different management systems such as annual and accelerated.
2. Compare various pasture and forage management techniques for reducing the cost of feeding sheep.
3. Develop an accurate mechanistic computer model for fast growing lambs sired by terminal sire breeds. Compare various feed production systems for feedlot lambs of terminal sires and the effect on lamb growth and carcass composition.

4. Assess the utility of such factors as rumen degradable protein and carbohydrates at maximizing rumen fermentative capacity.
5. Study the interaction between copper, molybdenum, sulphur, iron and zinc in sheep feeds and the effect on copper levels in the livers of sheep.
6. Compare different ration formulations and the effect on milk composition and components.

BACKGROUND

Computer modelling of results from past research offers a new tool to help to more accurately determine the nutritional requirements for highly productive sheep and fast growing market lambs. This data, beyond the inadequate recommendations provided by the 1985 NRC publications, would be of tremendous value to the sheep industry. The single greatest variable cost in sheep production is feed, therefore significant potential for reducing costs and increasing profit potential is through improvements in nutrition and feeding.

RECOMMENDATION #4 **PRIORITY 1B**
TO ARIO, UNIVERSITY OF GUELPH
MANAGEMENT & ECONOMICS

OBJECTIVES

1. Evaluate the economics of applying embryo transfer technologies for genetic improvement in sheep production as measured within the OLIBS study.
2. Compare the economic performance of selected maternal lines with traditional breeds under different management systems such as annual lambing and accelerated lambing.
3. Evaluate and improve the existing OMAFRA-supported computer program (EweByte) for the evaluation of health, productivity and genetic record keeping, particularly within the OLIBS study.
4. Identify potential microbial, mechanical and chemical hazards which relate to lamb and sheep meat and milk products and identify potential control points and risk factors during production, transportation and slaughter process .
5. Develop an economical, effective permanent animal identification system.

BACKGROUND

Technologies in reproduction, health, nutrition, genetics and meat production may be shown to improve productivity but the investment in research in these areas is only worthwhile if the improvements result in profit. A permanent animal identification program is essential for any disease control program or quality assurance program that involves slaughter house surveillance. As the sheep dairy industry continues to grow and develop it is important to research appropriate withdrawl times for milk and to establish standards for milk quality and handling.

RECOMMENDATION #5 **PRIORITY 2C**
TO ARIO, U OF G, CARC

GENETIC IMPROVEMENT

OBJECTIVES

1. Develop an overall breeding strategy for the development of maternal trait sheep. Monitor the performance of OLIBS ewes and determine the most economical breeding strategy which maintains high performance.
2. Develop genetic evaluations for maternal traits.
3. Develop genetic evaluation indexes for maternal and terminal line sheep as well as an economic index that could be used for commercial ewes.
4. Develop a terminal index or evaluations that would assist producers in selecting terminal type animals that will improve the carcasses of their animals specifically for the price grid of the current forward contract project
5. Develop genetic evaluations for dairy sheep traits such as milk yield, %fat and %protein.

BACKGROUND

The sheep industry has identified the production of superior maternal trait sheep as important to improving the productivity of the Ontario sheep flock. Prior to this, most genetic selection has been based on growth variables. Producers, in order to identify and select appropriate maternal trait animals for replacement, semen collection for artificial insemination or embryo recovery, require new tools. The OLIBS study offers a framework in which to develop and evaluate these tools. Sire referencing schemes are becoming more practical with the advent of successful AI programs. As the updated genetic selection tools are developed, indexes combining traits become more important as producers struggle to determine which trait is more important and how selection of different traits will impact on performance as a whole. Rail grading in the forward contract project has resulted in industry interest in selecting for those carcass traits that will improve the rail grade of their animals.

RECOMMENDATION #6 **PRIORITY 2B**
TO ARIO, U OF G, CARC

MEAT AND MILK PRODUCTION & EVALUATION

OBJECTIVES

1. Evaluate the carcass characteristics of the maternal lines produced under OLIBS.
2. Evaluate changes in carcass composition of lambs produced by terminal sire crosses of maternal trait dams and of lambs produced from sire referencing schemes.
3. Determine the appropriate fat cover of lamb for shelf life, palatability and consumer acceptance.
4. Evaluate the effect of breed, production system and milking frequency on milk yield and components in dairy sheep.

BACKGROUND

The future of the sheep industry is in the development of prolific, heavy milking sheep that can breed successfully out-of-season. However, these breeds have not been sufficiently muscled to meet the demands of the meat processor and consumer. Excellent terminal cross genetics exist in Ontario but the crosses need to be evaluated with respect to carcass characteristics. Terminal sires will continue to improve through the use of sire referencing schemes but the product lambs of such schemes need to be evaluated with respect to carcass characteristics in order to make appropriate genetic selection.

NON RESEARCH RECOMMENDATIONS

RECOMMENDATION #1
TO OMAFRA & CFIA - ANIMAL AND PLANT HEALTH - AAFC
MAEDI VISNA CERTIFICATION PROGRAM

As part of the OLIBS project, a provincial flock health program will be made available to Ontario sheep producers. Level 1 which involves no disease testing, is now administered by the Ontario Sheep Marketing Agency. However, the industry is very anxious to have specific disease accreditation programs for diseases such as Maedi Visna. The intent is to have a ***cost recovery provincial program***, administered by both OMAFRA and OSMA. OMAFRA would take on the fee for service role of assuring the correct paperwork were submitted by the veterinarians doing the flock testing, receiving the results of the test and issuing certificates of status. OSMA would coordinate with OMAFRA on providing a list of those producers enrolled in the Level 1 program (a pre-requisite for any Level 2 program). It is particularly important that OMAFRA be involved in the Level 2 certification program for other countries to recognize the validity of the program.

RECOMMENDATION #2
TO OMAFRA
TECHNOLOGY TRANSFER

Technology transfer is becoming increasingly important as the research program continues to develop. In order to support the development of the sheep industry it is important to support the leading edge producers. Development of the industry will depend on producers of a viable commercial size. In order to attract commercially minded farmers from other agricultural commodities, it is necessary to have good leading edge information and extension support available. At the same time, there are ongoing concerns relating to the continual cycle of new small producers and how to educate these producers and reduce misinformation in the sheep industry. The following are the areas of primary importance for sheep technology transfer and extension:

- Technology transfer to leading edge producers is essential particularly in the areas of genetics, health, nutrition, reproduction, production and management systems.

- Contact must be maintained with other large sheep producing regions and countries to ensure that Ontario sheep producers can take advantage of their, in most cases, much expanded sheep resources in the form of information, expertise and leading edge technology.
- Ongoing support of the predator information officer, the compensation program and a continued evaluation of predator control methods since predators continue to restrict the expansion of the sheep industry in many parts of the province.
- Continued support for the Ontario genetic evaluation system (SFIP) as it is the only system currently available in North America that produces genetic evaluations for sheep on a regular basis.
- Continued emphasis on developing sheep resources and extension materials that can be widely used by beginning sheep producers.

RECOMMENDATION #3
TO AAFC-CANADIAN FOOD INSPECTION AGENCY, OMAFRA & THE ANIMAL HEALTH LABORATORY, LABORATORY SERVICES DIVISION, U OF G
SCRAPIE PROGRAM

In the last two years, the number of flocks with diagnosed cases of scrapie has increased dramatically, indicating that the current control program is not sufficient in controlling this disease. We recommend that a ***passive Scrapie surveillance system*** be implemented that will screen adult sheep for Scrapie that are submitted to Ontario Animal Health Laboratories for neurological disease. An ***active surveillance system*** on slaughter house cull sheep should also be considered and implemented as soon as possible. In addition, a ***voluntary scrapie disease status certification program*** should be established for the province and perhaps for the country.

RECOMMENDATION #4
TO AAFC - CANADIAN FOOD INSPECTION AGENCY
BRUCELLA OVIS CONTROL

No response was received to our previous recommendation. *Brucella ovis* is an emerging disease in sheep in Canada. Experience in other countries (e.g. USA, New Zealand) tells us that by ignoring this disease, its prevalence and its outcome- infertility, will climb rapidly. The disease is relatively rare in Ontario but increasingly common in the western provinces. Recommendation for the cessation of testing of sheep imported to Canada has been very controversial in the sheep industry. Serological testing for other than export, should be readily available to veterinarians that are attempting to identify and control this disease.

XI. APPENDIX

Duties & Terms of Reference of Committee

1.T o review sheep research and service being carried out in Ontario.
2.T o disclose problems that face the sheep industry and that which require investigation.
3.T o assess the relevance of research and service programs and suggest priorities for new research programs, and to recommend what programs underway should be continued expanded or terminated.
4.T o estimate the cost involved to conduct research and service programs and to supply cost-benefit information if possible.
5.T o supply this information in written reports to the OARSC.
6.T o invite researchers in Ontario to information meetings where progress in research and services with sheep can be presented.
7.T o function through an animal species chairman who will be appointed by the OARSC. The appointment of the chairman will be for four years. He will not succeed himself but may serve an additional four year period with at least a four year absence in between each period.

Inventory of Person-Years

Inventory of Person-Years in Sheep Research in Ontario – 1998-99

Location	Faculty P.Y	Staff P.Y.	Technical P.Y.
New Liskeard Agricultural Research Station (University of Guelph)	0.1	0.4	1
University of Guelph	1.85	3.5	0.4

Inventory of Person-Years in Sheep Services in Ontario - 1998-99

Type of Support	Sheep Specialist P.Y.	Extension Assistants P.Y.
OMAFRA - general	0.5	-
OMAFRA - nutrition	0.1	-
OMAFRA - genetics & reproduction	1.0	-
OMAFRA - health	0.4	-

ONTARIO SHEEP RESEARCH & SERVICES COMMITTEE - 1998-99			
NAME	**LOCATION**	**AFFILIATION**	**TERM TO**
Dr. Paula Menzies	Dept Population Medicine, U.Guelph, Guelph, Ont., N1G 2W1 (519) 824-4120 ext 4043 FX (519) 763-8621, Email pmenzies@ovcnet.uoguelph.ca	Veterinary Practitioners	2003
Fred Baker	OSMA, RR#3, Mountain, Ont, K1A 0T6, (613) 989-5352 FAX (613) 989-3919 Email bakefre@statcan.ca	OSMA, CSF	2000
Dr. Brian Buckrell	Dept of Population Medicine, OVC, U of Guelph, Guelph, Ont, N1G 2W1 (519) 824-4120 ext 4011 FX (519) 763-8621 Email bbuckrell@ovcnet.uoguelph.ca	Researcher - OVC	2003
John Cuthbert	Canadian Co-op Woolgrowers, RR#1 Cookstown, Ont. L0L 1L0 (705) 458-4800 FX(705) 458-0186	CCWG	2000
Gail Irvine	RR#4, Peterborough, Ont, K9J 6X5, (705) 292-7209 FX (705) 292-0460 Email: RIRVINE@TrentU.ca	Producer	1999
Jim Johnston	New Liskeard AR S, Box G, New Liskeard, Ontario, P0J 1P0 (705) 647-6701 ext 26 FX (705) 647-7008	Researcher - OMAFRA	2002
Delma Kennedy, Chair	Agriculture & Rural Division, 3 N.E., OMAFRA, 1 Stone Rd., Guelph, Ont, N1G 4Y1,(519) 826-3290 FX (519) 826-3254 Email: dkennedy@omafra.gov.on.ca	SFIP - OMAFRA	2000
Reta Moyer, Manager	OSMA, 730 Malcolm Rd, Guelph, Ont, N1K 1B1, (519) 836-0043 FX (519) 824-9101 Email· osma@freespace.net	OSMA	2002
Dr. John Martin	Wellington Place, OMAFRA, RR#1, Fergus, Ontario, N1M 2W3 (519) 846-0965 FX (519) 846-8101 Email jmartin@omafra.gov.on.ca	OMAFRA, Vet extension	2000
Bill McCutcheon	RR#2 Grand Valley L0N 1G0 Ph/Fax:(519) 928-9626	Cdn Sheep Breeders Assoc.	2000
Ewen McMillan	1354, 66 Regional Road, Caledonia, Ontario, N3W 1R2, (905) 765-5705 FX (905)238-1160	Feed Industry	1999
Axel Miester	Wooldrift Farm, RR#1, Rockwood, Ontario, NoB 2K0 (519)856-2482 Email: wooldrif@sentex.net	Sheep Dairy Producers	2001
Anita O'Brien	OMAFRA, Postal Bag 7800, Kingston, Ont, K7L 5T4 (613) 531-5580 or 531-5589 FX (613) 531-5585 Email aobrien@omafra.gov.on.ca	OMAFRA - extension	2003
Alan Ribbink	RR#1, Tiverton, Ontario, N0G 2T0 (519) 368-7691 FX (519) 368-7522	Producer	1999
David Wight	RR#1, Belle Vallee, Ontario, P0J 1A0 (705) 647-8686 FX (705) 647-4765	Wool Processor2000	
Ralph Stevens Chair, OSMA	21305 Heritage Rd., RR#2, Thorndale, Ontario, N0M 2P0 (519)461-1315 Email:	OSMA	2001
Laurie Murdock, Executive Director	Ontario Independent Meat Packers and Processors, P.O. Box 20059, Woodland Postal Outlet, Guelph,Ontario N1H 6H6 (519) 763-4558; 1-800-263-3797 (519) 763-4164 FAX	Meat Processors Industry	not a member

ONTARIO TURKEY RESEARCH AND SERVICES COMMITTTEE

EXECUTIVE SUMMARY

This report is based on the discussions at the Committee's annual meeting. The Number One priority last year was researched through a co-operative Grow Ontario project with spin-off projects. Other priority research needs were not met as will be discussed in the section of this report entitled, *Action taken on last year's recommendations.*

It was agreed last year by the Committee members that an expanded committee would be appropriate and encouraged. New members were welcomed at this year's committee meeting.

INTRODUCTION

The turkey committee meeting was held in conjunction with the meeting of the broiler and layer committees on September 1, 1999 at the Kay House, Arkell. The committees discussed areas of mutual concern and reviewed the listing of poultry research projects of the University of Guelph. More information regarding this listing was received by the Committee members, particularly the FTE and dollar amounts allocated and short abstracts.

The Committee stated that an Ontario-based (U. of G) research day would be very appropriate in order to familiarize the Ontario poultry industry with the excellent research and researchers being funded through this system.

STATE OF THE INDUSTRY

Ontario has a stable turkey industry, which produces 42.5% of Canada's turkeys. Ontario's population has increased from 8.2 million (1974) to 11.41 million (1997). The number of turkey producers in the province has not followed suit, ranging from 154 to 168 over the past 15 years.

There are six registered turkey hatcheries out of 19 across Canada. There are 10 federally-inspected turkey slaughter plants and 13 provincially-inspected poultry plants. Ontario is a major player in the further processing industry with 119 federally inspected further processing plants.

Farm cash receipts for the Ontario turkey industry is $124.1 million, up from $46 million in 1974, and production quota allocation stands at 54.5 million kilograms (this includes conditional allotments for primary and multiplier breeders).

Although Ontario's population has grown dramatically, the per capita consumption of turkey at approximately 4.9 kg has remained stable. Processors are working diligently in cooperation with the producer marketing board to expand the fresh turkey and parts market in Ontario. This year the Ontario Turkey Producers' Marketing Board sponsored Oktoberfest events. A new multi-million dollar media campaign was launched April - September 1999 called "Turkey Tuesdays" to encourage consumption on a more regular weekly basis.

Within the commercial foodservice industry, the consumption of turkey entrees has remained constant; however, there have been dramatic increases in the popularity of turkey sandwiches and turkey submarines since 1993.

An increase in price of turkey production quota from approximately $1.18/lb to $1.35 - $1.50/lb occurred recently. Otherwise, the industry has been stable with growth in the >8 kg market.

RESPONSE TO 1998 RECOMMENDATIONS

RECOMMENDATION #2 **PRIORITY 1A**
TO ARIO, AAFC, CARC, OMAFRA, U of G
MARKETING STUDY

An economic study involving retailers, consumers, processors, producers and further processors is needed to assess the potential of the Ontario market.

The consumption of turkey in Ontario has stayed at the stable level of 4.8 kg/person/year for many years.

A "needs" assessment and comparison should be done to understand the differences in consumption patterns/product lines, etc. of other regions (countries) that have a higher per capita consumption rate of turkey than Ontario.

Response
ARIO recognizes the need for marketing strategies to assist an industry in maintaining and/or expanding its market share. The mandate of ARIO is to review the research needs of the agriculture industries. It can be argued that the recommendation as described above is a service need as the basic research information is available and needs to be compiled and analyzed. It would be appropriate for this to be forwarded to the University of Guelph and OMAFRA (Agriculture & Rural Division) for response.

UNIVERSITY OF GUELPH is not addressing the recommendations outlined above in the Animal Research Program in 1998-99. However, with OASCC and OMAFRA direction, we will again put out a call for this research undertaking in 1999-2000.

RECOMMENDATION #3 **PRIORITY 1B**
TO: ARIO, AAFC, CARC, OMAFRA, U of G
DETERMINATION OF FEED INGREDIENTS/NUTRIENT EVALUATION

More research is need in this area as 70% of turkey meat production costs is feed. Carbohydrate digestibility and protein digestibility values are needed for all ages and breeds of turkeys for the more common feed ingredients used in Ontario turkey diets.

Response
ARIO acknowledges the economic significance of feed input costs. More efficient feed management/utilization reduces these costs and ultimately results in increased competitiveness of the industry as a whole. The 1997-2001 approved poultry research program addresses the above recommendation through work that can be done under Objective 1, Goal 1.1 ("*To improve biological efficiency by identifying improvements in poultry nutrition and health which increase digestive efficiency, reduce metabolic and reproductive disorders and promote desirable product composition or performance*")

UNIVERSITY OF GUELPH is addressing the recommendations concerning Turkey Ingredients/ Nutrient Evaluation by the following research project:

Project #	Leader	Title
16120	Smith, T.	Applications of feeding polyamines to poultry

Complete details regarding the research undertakings listed can be found on the University of Guelph/OMAFRA research website at: **www.uoguelph.ca/research/omafra/research_prog.**

RECOMMENDATION #4 **PRIORITY 2B**
TO ARIO, AAFC, CARC, OMAFRA, U of G
REDUCTION OF MORTALITY OF TURKEY POULTS

Research is needed to identify the most prevalent factors influencing poult mortality. Development of husbandry techniques to optimize production are also needed.

Response
ARIO recognizes the importance of poult mortality to the turkey industry. Objective 1, Goal 1.6 addresses this recommendation through research that can be done "*to improve the survival of neonatal poultry.*

UNIVERSITY OF GUELPH is not addressing the recommendations outlined above in the Animal Research Program in 1998-99. However, with OASCC and OMAFRA direction, we will again put out a call for this research undertaking in 1999-2000.

In addition, we would like the committee to note that several publications on this subject are soon to be released from the laboratories of Dr. Ian Duncan.

1999 RESEARCH & SERVICES RECOMMENDATIONS

RECOMMENDATION #1

DISEASE - FIREFIGHTER RESEARCH

BACKGROUND

Every year new disease conditions or unusual presentations of recognized diseases are identified in the Ontario poultry industry. In many instances these have significant potential consequences for the Ontario industry. The initiation of formal research projects to investigate these sorts of problems involves identifying funding sources, sending proposals through industry and outside funding agencies and there is often a significant delay in initiating the research and providing useful information to the industry. In many of these cases, short term practical research projects may either solve the problem, determine if longer term research is warranted and provide immediate practical information to the industry. Examples of this type of project might be to evaluate the importance of an emerging condition to the poultry industry, to verify if an agent isolated from a disease condition is indeed a pathogen, to determine if current vaccination programs, licensed vaccines or other treatments will be effective in preventing the condition, or perhaps to put together an epidemiologic profile of an emerging condition that will lead to practical recommendations to the industry on prevention or direct further research.

There is presently no source of funds for these practical short term projects. An application procedure would be established to allocate these funds, presumably through a joint university/industry review panel.

OBJECTIVE

To establish a source of funds for short-term immediate investigations of emerging disease conditions or other emerging industry priorities.

RECOMMENDATION #2

MARKETING STUDY

The consumption of turkey in Ontario has stayed at the same level since the seventies. An economic study involving retailers, consumers, processors, producers and further processors is needed, perhaps by the Family and Consumer Studies Department (U of G), to assess the potential of the Ontario market. The comparison should highlight the differences in consumption patterns/product lines etc. of other regions (countries such as U.S. and France) that have much higher consumption rates than Ontario. This project could attract interest with the possibility of industry funding similar to the "Turkey Tuesdays" campaign which was sponsored with a check-off of ½¢/kg from processors and ½¢/kg from the producer board.

RECOMMENDATION #3

NUTRIENT EVALUATION FOR ALL AGES AND BREEDS OF TURKEYS FOR COMMON FEED INGREDIENTS UTILIZED IN COMMERCIAL TURKEY RATIOS.

Turkey meat production has become a year-round enterprise to supply the increasing demands of the further processing industry. As a result, improvements in housing, management, breeding stock and nutrition are necessary to meet these demands economically. Feed represents approximately 70% of the cost of producing turkey meat and therefore presents a tremendous opportunity for improving the profitability of Canadian turkey production. The feed industry has invested heavily in recent years in new feed production technologies to produce safe wholesome feeds. However, accurate data on the nutrient requirements of modern turkey strains and nutrient composition of feed ingredients is necessary to ensure that feeds meet the turkey's needs at optimal cost.

I. **Nutrient Requirements**

Today, an 18 week old tom turkey is approximately 6 kilograms heavier than its predecessor of 20 years ago. Much of the additional weight is breast muscle. The nutrient requirement data available has to a large extent been extrapolated from studies of poults up to 8 weeks of age conducted with turkeys of lesser growth potential. Research is needed to establish the nutrient requirements of modern strains, particularly as it affects component yields i.e. breast meat.

II. **Ingredient Evaluation**

A. Nutrient Composition of Feedstuffs

Grains, oilseed meals, byproducts (grain, animal/poultry, food wastes, etc.) and new varieties (high oil corn, low-phytate corn) are inherently variable as a result of genetic, geographic, weather and storage effects. Development of an accurate database of nutrient values is critical to the process of optimal-cost formulation of feeds. Ontario feed manufacturers must be able to utilize local feedstuffs with confidence to remain competitive.

B. Nutrient Availability

Feedstuffs vary not only in their content of nutrients but also in the degree to which the nutrients can be utilized. A number of factors may influence the nutrient availability of a feedstuff i.e. variety, growing/harvest/storage conditions, age of poult, poult health status and feed processing (grind size, conditioning/expansion/compaction, drying). Accurate values for availability of energy and essential amino acids would allow for more precise valuation of feedstuffs and formulation of feeds.

RECOMMENDATIONS #4

IMPROVEMENT OF LIVEABILITY AND PERFORMANCE OF TURKEY POULTS

Research is needed to identify the most prevalent factors influencing poult mortality. Focus on poult enteritis, field rickets, stunting.

RECOMMENDATION #5

HEALTH: SOLVING E. COLI LOSSES OF THE ONTARIO TURKEY INDUSTRY.

The Grow Ontario research project began addressing this priority. Dr. Bruce Hunter and Dr. Ian McMillan and their two graduate students are working towards on new spin-off projects. The project was co-operatively funded by the Ontario Turkey Producers' Marketing Board and Grow Ontario. The four major processors were also partners of this project.

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